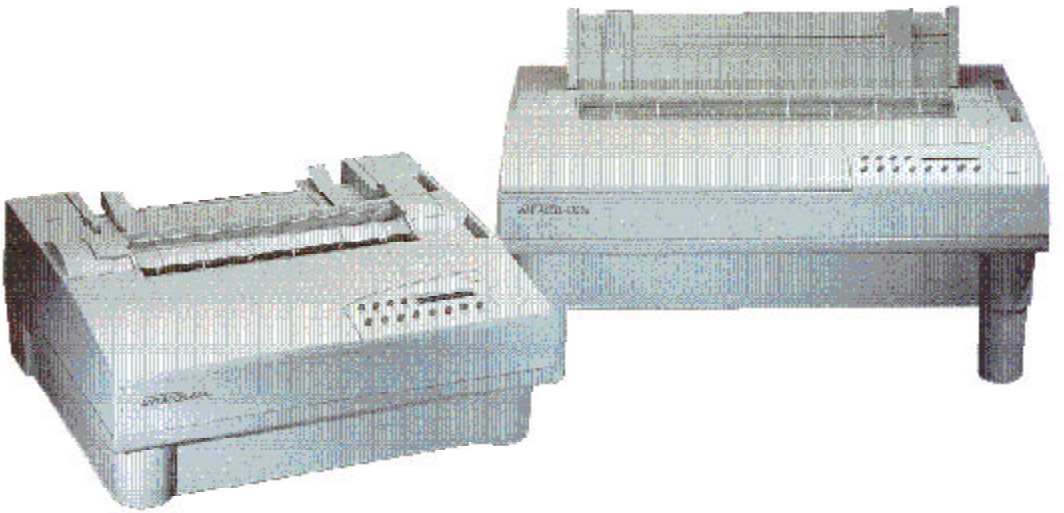
AMT Datasouth

AMT ACCEL-6300

PRINTER SERIES

User's Guide



Document No. 387002, Rev. E

AMT Datasouth

AMT® ACCEL™-6300
PRINTER SERIES

User's Guide

Document No. 387002 ● Revision E

AMT Datasouth Corp.
4765 Calle Quetzal
Camarillo, CA 93012

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Preface

Thank you for selecting an AMT Datasouth® ACCEL™-6300 series printer. Using an all-metal chassis, 24-wire dot-matrix printhead, state-of-the-art electronics, and simple user controls, your printer will provide fast and reliable printing for years to come.

Printer Models

AMT Datasouth ACCEL-6300 series printers consist of four models. Each model is distinguished by the following features:

MODEL	Narrow-carriage 11-inch-wide printing	Wide-carriage 16-inch-wide printing	Motorized bottom-feed forms tractor
ACCEL-6310	✓		
ACCEL-6310d ...	✓		✓
ACCEL-6350		✓	
ACCEL-6350d ...		✓	✓

About This User's Guide

This user's guide provides information that will help you set up and operate all of the models in the AMT Datasouth ACCEL-6300 printer series. If you are using the printer for the first time, you should perform the procedures in sections 1, 2 and 3 to set up the printer. Then, use section 4 to learn how to use control panel functions. The rest of the guide contains reference information that will help you get the most from your printer.

The guide is divided into six sections and five appendixes:

- ✓ Section 1, *Unpacking,* describes how to find a good place for your printer and unpack it.
- ✓ Section 2, *Set Up,* points out the various components you use to operate the printer and describes how to install the paper deflector and ribbon cartridge. It also describes how to check the voltage select switch, attach the power cord, turn the printer on, load paper, print a self test and attach the interface cables.
- ✓ Section 3, *Loading Paper,* describes how to load various kinds of media into the printer, including single sheets, pin-feed paper, multi-part forms, labels and transparencies.
- ✓ Section 4, *Control Panel,* describes how to use the control panel.
- ✓ Section 5, *Cleaning and Maintenance,* describes how to keep your printer in good shape and how to replace the ribbon cartridge, print-head and fuse.
- ✓ Section 6, *Solving Problems,* describes printer messages, provides a troubleshooting guide, and shows how to run printer tests.
- ✓ Appendix A, *Bottom-Feed Tractors,* describes how to use the powered bottom-feed forms tractors on the AMT Datasouth ACCEL-6310d and -6350d models.
- ✓ Appendix B, *Bar Codes,* provides information on printing bar codes.
- ✓ Appendix C, *Interfaces,* provides technical information on the parallel and serial interfaces of the printer.
- ✓ Appendix D, *Code Sets,* describes the printer's code sets.
- ✓ Appendix E, *Specifications,* lists printer specifications.

Conventions

Some of the procedures in this guide contain special notices that highlight important information:

☞	**Notes**	Indicate information that you should know to help your printer run properly and efficiently.
✋	**Cautions**	Indicate guidelines that, if not followed, can cause damage to equipment.
⚠	**Warnings**	Indicate a situation where there may be a danger to yourself.

The use of the terms *right* and *left* assume that you are looking at the front of the printer.

Technical Support

If you have a problem with your printer, refer to the *Solving Problems* section for troubleshooting information. If you are unable to solve the problem yourself, contact the Dealer that sold you the printer. The Dealer should be able to assist you or tell you where to find additional help.

Trademarks

Copyright

One-Year Limited Warranty

AMT Datasouth Corp. ("AMT Datasouth") warrants your printer to be free from defects in materials and workmanship for a period of one year from the date of purchase from AMT Datasouth or an Authorized AMT Datasouth Dealer. This warranty is limited to the original purchaser ("Purchaser") of the printer and is not transferable.

AMT Datasouth's obligation under this warranty is limited to replacing or repairing, at its option, at its designated site, and by its designated agent, any prod-ucts or major assemblies that are returned to AMT Datasouth or its agent within the warranty period that are found by AMT Datasouth to be defective in proper usage. Purchaser may, at its option, return the printer to AMT Datasouth or disassemble the printer and return to AMT Datasouth only the major assembly needing repair, refer-encing in writing the serial number of the major assembly needing repair and the serial number of the product from which the assembly is removed. Purchaser shall prepay transportation and insurance charges to AMT Datasouth's designated site. If returned parts are repaired or replaced under the terms of this warranty, AMT Datasouth will prepay transportation charges back to Purchaser's location; otherwise, Purchaser shall pay transportation and insurance charges in both directions.

One-Year Limited Warranty—continued

Dated proof-of-purchase must be provided by the Purchaser when request-ting warranty work to be performed. (A warranty reply card is included at the back of this guide and should be returned to AMT Datasouth within 10 days of accepting the product.) The Purchaser may request information on how to get warranty service by contacting an Authorized AMT Datasouth Dealer or writing to AMT Datasouth Corp., 4765 Calle Quetzal, Camarillo, CA 93012 for further information.

THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WITH RESPECT TO THE PRODUCTS, EITHER EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANT-ABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY OTHER OBLIGATION ON THE PART OF AMT DATASOUTH.

THE FOREGOING LIMITED WARRANTY SHALL CONSTITUTE THE SOLE AND EXCLUSIVE OBLIGATION AND LIABILITY OF AMT DATASOUTH. IN NO EVENT SHALL AMT DATASOUTH BE LIABLE FOR INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, AND IN NO EVENT SHALL THE LIABILITY OF AMT DATASOUTH ARISING IN CONNEC-TION WITH ANY PRINTER SOLD HEREUNDER (WHETHER SUCH LIABILITY ARISES FROM A CLAIM BASED ON CON-TRACT, WARRANTY, TORT OR OTHERWISE) EXCEED THE ACTUAL AMOUNT PAID BY THE PURCHASER FOR THE PRINTER.

Factory Service

If you suspect that your printer needs service, first contact the Dealer that sold you the printer. The Dealer will ask you for the printer's model num-ber and serial number, the date you purchased the printer, and an explanation of the problem. In the event that your Dealer is unable to help you and the warranty period is in effect, contact AMT Datasouth Corp., 4216 Stuart Andrew Blvd., Charlotte, NC 28217, (704) 523-8500, option 4, and ask for the Technical Support department. Be ready to provide the name of the Dealer that you contacted, the printer's model number and serial number, the date you purchased the printer, and an explanation of the problem.

If the AMT Datasouth Technical Support Representative is unable to solve the prob-lem on the phone, you will be issued a Return Materials Authorization number (RMA number) and an address where to ship your printer for service. You must write the RMA number on the outside of the printer's shipping carton so that AMT Datasouth will accept the printer when it arrives at the Service Center. You must also enclose a copy of your purchase receipt or some other proof of the date of original purchase. You must send your printer prepaid and with adequate insur-ance to the supplied address. If the printer is repaired under the terms of the warranty, AMT Datasouth will prepay transportation charges back to your location, provided that this location is within the continental United States; otherwise, you must pay transportation and insurance charges in both directions.

YOU MUST USE THE ORIGINAL PACKING MATERIAL TO SHIP YOUR PRINTER; OTHERWISE, A CHARGE WILL BE INCURRED FOR REPACKAGING.

Agency Compliances

AMT Datasouth ACCEL-6300 series printers have been tested and found to comply with the applicable U.S. and Canadian requirements of Underwriters Laboratory Inc.®

LISTED File Number E173440
I.T.E.

AMT Datasouth ACCEL-6300 series printers have been tested and found to comply with the applicable requirements of TÜV Rheinland.

Customer Number K720841

EN 60950:1992
AM1:1993
AM2:1993

AMT Datasouth ACCEL-6300 series printers have been tested and found to comply with the applicable requirements of EMC Directive 89/336/EEC.

EN55022 (1987)
EN50082-1 (1992)

As an ENERGY STAR® Partner, AMT Datasouth Corp. has determined that this product meets ENERGY STAR® guidelines for energy efficiency.

FCC
Class B

Instruction to the User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

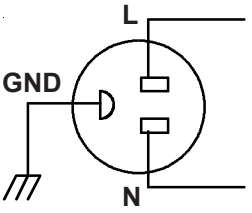
- ✓ Reorient or relocate the receiving antenna.
- ✓ Increase the separation between the equipment and device.
- ✓ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ✓ Consult the dealer or an experienced radio/TV technician for help.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to this equipment without the approval of manufacturer could void the user's authority to operate this equipment.

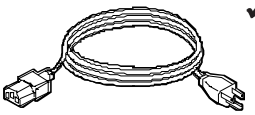
Caution: Interface connectors may exceed class 2 or LPS limits. Appropriate interconnecting cabling in accordance with the NEC shall be used during installation.

Power Precautions

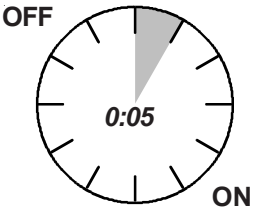
When installing and using the printer, be sure to take the following precautions:



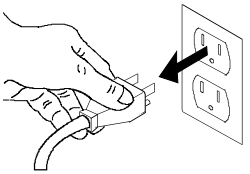
✓ Use the appropriate power supply and voltage frequency. Be sure to check the voltage select switch before the printer's first installation.



✓ Make sure the *total* length of the power cord does not exceed 16.4 feet (5 meters). Using a longer power cord can result in reduced voltage and possible malfunctions. Do not use an extension cord.



✓ After turning the power off, always wait at least five seconds before turning it back on.

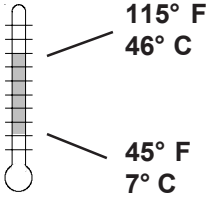


✓ In case of smoke, odd smells, or other trouble, unplug the power cord. Do not place furniture or other obstacles in front of the outlet.

Caution: When unplugging the power cord, pull the plug, not the cord.

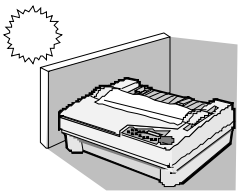
Operating Precautions

When installing and using the printer, be sure to take the following precautions:

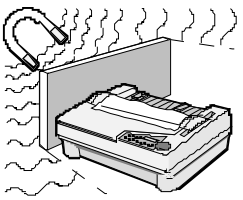


✓ Use the printer only within the following temperature and humidity ranges:

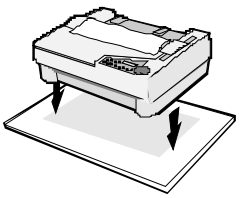
Ambient temperature: 7° to 46° Centigrade (45° to 115° F)
Relative humidity: 10% to 85% noncondensing



✓ Avoid direct sunlight. Use a blind or heavy curtain to protect the printer from direct sunlight when the printer is near a window.

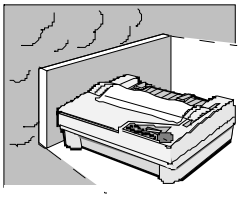


✓ Do not install the printer near devices that contain magnets or generate magnetic fields.

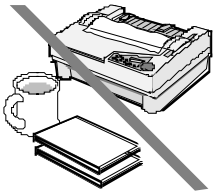


✓ Place the printer on a flat, horizontal surface. Protect the printer from strong physical shocks and vibrations. Lift the printer from underneath and on both sides.

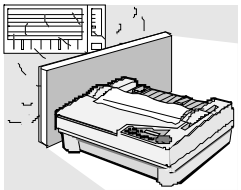
Operating Precautions—continued



✓ Keep the printer clean. Dust accumulation and paper fiber deposits can cause the printer to function improperly.



✓ Do not place cups, books or other objects on top of the printer. Be careful not to hang jewelry, clothes or hair near the paper entry slots.



✓ Do not install the printer near an air conditioner.

AMT DATASOUTH CORP.
4765 Calle Quetzal
Camarillo, CA 93012

Contents

Figures and Tables

Figures

Tables

Section
1

Unpacking

This section describes how to select a good place for the printer and unpack it. If the printer is already set up, you can skip ahead to the next section.

Selecting a Good Place for the Printer

When selecting a place for your printer, observe the following guidelines:

- ✓ The site must be large enough to accommodate the printer. For *narrow*-carriage models, the site must be at least 21 inches (54 cm) wide by 19 inches (49 cm) deep. For *wide*-carriage models, the site must be at least 26 inches (66 cm) wide by 19 inches (49 cm) deep.
- ✓ The printer must be close enough to the computer for your cable to reach: 10 feet (3 meters) for parallel or 50 feet (15 meters) for serial.
- ✓ The printer must be on a flat, solid surface—never on a chair or any other unstable support.
- ✓ Choose a place that is clean and free from excessive heat (including direct sunlight), moisture, and dust.
- ✓ Use a grounded outlet—one that has three holes to match the power plug on the printer. Don't use an adapter plug or an extension cord.

Selecting a Good Place for the Printer—continued

- ✓ Avoid outlets on the same circuit with large motors, such as copiers or postage machines, or other appliances that might disturb the power supply.
- ✓ Leave several inches of empty space in front, behind, and on both sides of the printer for good air flow.
- ✓ Leave proper clearances for your paper loading needs.

Unpacking the Printer

To unpack the printer, use the following procedure:

1. Cut the packing tape and open the shipping carton.
2. Remove the components that are packed on top and around the printer.
3. Grasp the front and back edges of the printer and lift the printer out of the shipping carton.
4. Remove the foam end caps and place the printer on the site you selected.
5. Remove the protective plastic covering from the printer.
6. Peel off the tape that secures the wire locking loops on the parallel interface connector. The parallel interface connector is located on the back of the printer.
7. If your printer has a powered, bottom-feed forms tractor, peel off the tape that holds the pop-down supports in the raised position. This tape is located on the lower sides of the printer.
8. Verify that you have all of the items shown in figure 1-1. If anything is missing or damaged, contact the Dealer that sold you the printer.
9. Fill in the *Warranty Registration Card* at the back of this guide and mail it to AMT Datasouth. Returning this card ensures that you will be notified of the latest printer news and enhancements.
10. Save the packing materials in case you need to ship the printer later.

Unpacking the Printer—continued

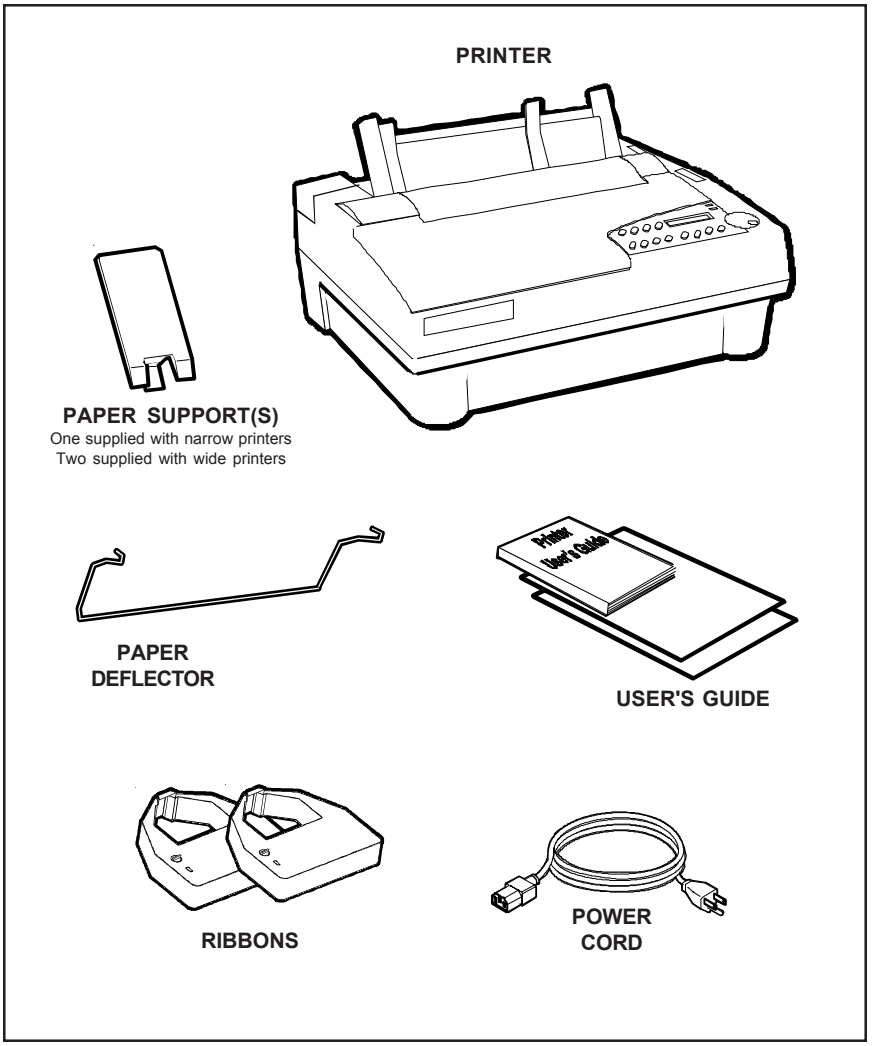


Figure 1-1. Unpacking the Printer

Removing Internal Packing

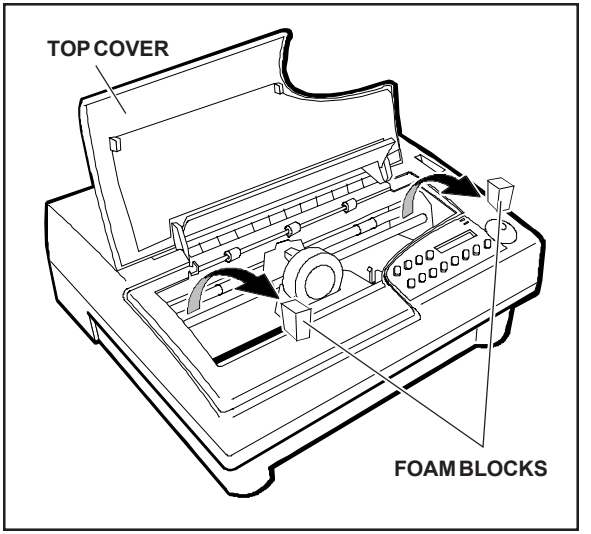


Figure 1-2. Removing the Foam Blocks

To remove the internal packing, use the following procedure:

1. Raise the top cover and locate the two foam blocks (one on each side of the main carriage shaft).

2. Carefully remove the foam blocks from the printer, as shown in figure 1-2.

3. Lower the top cover.

Be sure to save the internal packing materials with the rest of the packaging in case you need to ship or store the printer later.

Section

2

Set Up

This section points out the various printer components that you use to operate the printer and describes how to install the paper deflector and ribbon cartridge. This section also describes how to check the voltage select switch, attach the power cord, turn the printer on and off, load paper, print a self test, and attach the interface cables.

Introducing Printer Components

You should familiarize yourself with the printer components that are shown in the figures on the following pages. They are referred to in the procedures throughout this guide.

Introducing Printer Components—continued

SELECT-DIAL CONTROL PANEL

Provides easy setup and configuration of the printer

FORMS THICKNESS INDICATOR

Shows the current forms thickness

TRACTOR SELECT INDICATOR

Shows whether the rear forms tractors are engaged or disengaged

PAPER SUPPORT EXTENDER

Provides additional support for long, single sheets

PAPER SUPPORT

Guides single sheets into the printer

PLATEN ACCESS COVER

Permits access to the platen shaft and gears for mounting paper handling accessories

PLATEN WINDOW

Lets you see printing in progress and helps guide paper as it exits the printer

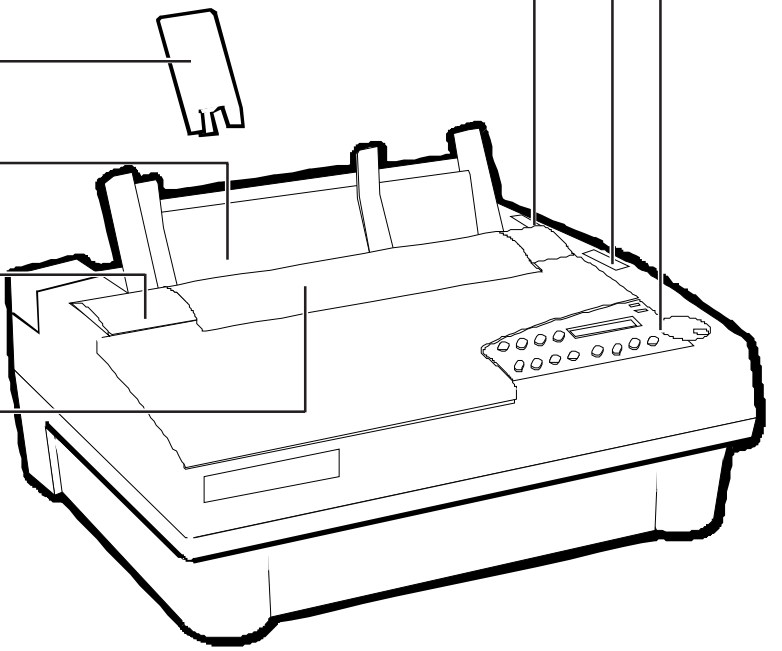


Figure 2-1. Printer Components, Front

Introducing Printer Components—continued

TOP COVER

Opens to reveal the carriage, ribbon and printhead

PLATEN

Provides a firm print impression surface

BAIL

Holds paper firmly against the platen with pressure rollers

PAPER SCALE

Provides an easy way to align paper

PRINT LINE INDICATOR

Shows the current print line on the page

PRINTHEAD

Impacts the ribbon and paper to produce printed images (user-replaceable and has 24 wires for high-quality printing)

CARRIAGE

Carries the printhead and ribbon cartridge from side-to- side

RIBBON

Holds the continuous-loop inked ribbon and is user- replaceable (black and color ribbons are available)

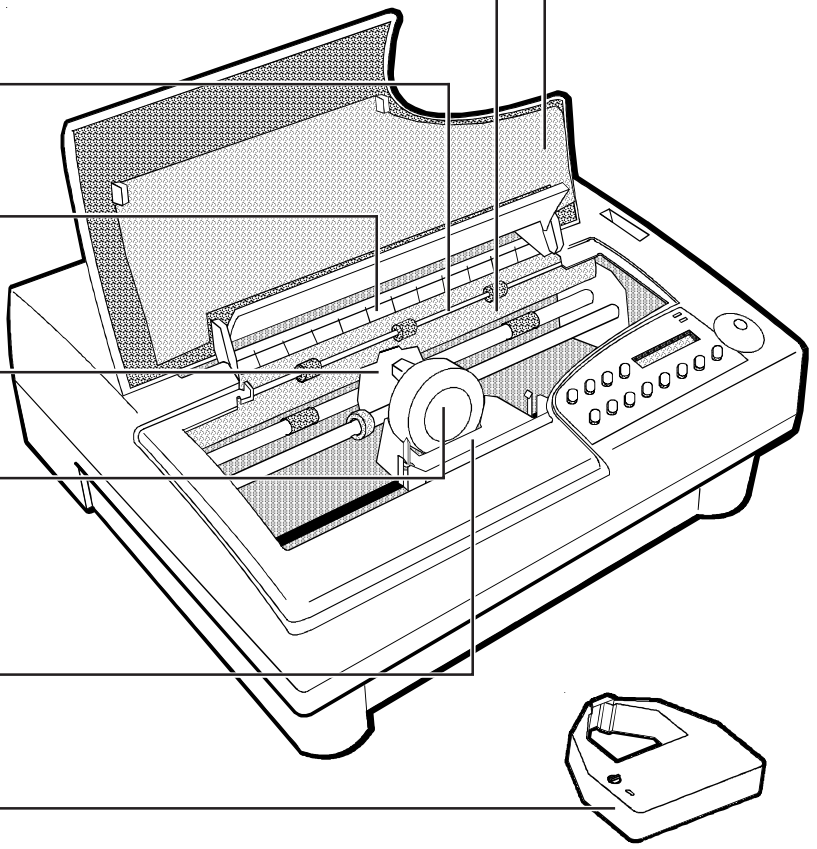


Figure 2-2. Printer Components, Internal

Introducing Printer Components—continued

INTERFACE CONNECTORS

Receives parallel and serial interface cables

FORMS TRACTORS

Guides pin-fed paper into the printer

TRACTOR COVER

Helps to reduce noise and guide paper; snaps into the raised position to allow access to forms tractors

VOLTAGE SELECT SWITCH

Lets you set up the printer to receive U.S. or international input power

AC POWER RECEPTACLE

Receives the power cable

POWER SWITCH

Lets you turn the printer on and off

FUSE COMPARTMENT

Contains the main power fuse and a spare fuse

PAPER DEFLECTOR

Hooks onto the rear tractor support shaft and deflects pin-fed paper away from the power and interface cables

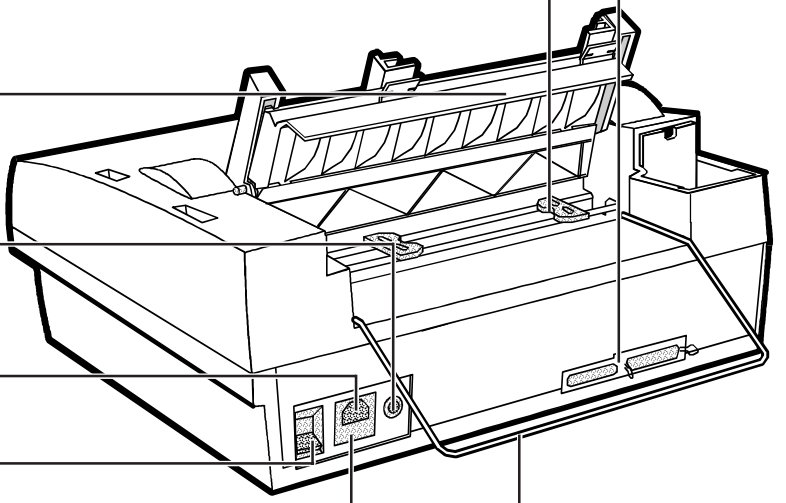


Figure 2-3. Printer Components, Rear

Installing the Paper Deflector

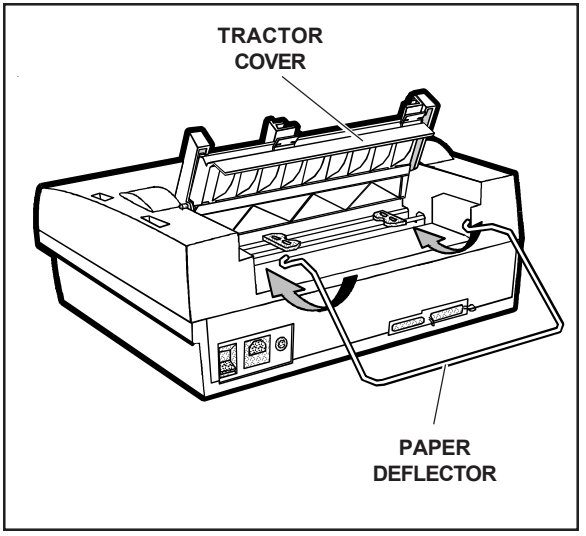


Figure 2-4. Installing the Paper Deflector

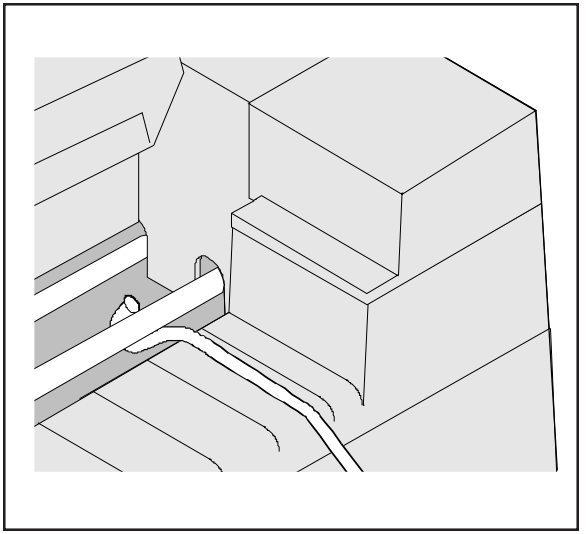


Figure 2-5. Hooking the Paper Deflector

The paper deflector hooks onto the rear tractor support shaft to keep pin-feed paper away from the interface and power cables. To install the paper deflector, use the following procedure:

1. To gain access to the forms tractors, raise the tractor cover until it snaps into the raised position. Then, align the paper deflector, as shown in figure 2-4.

2. Hook both ends of the deflector onto the rear tractor support shaft, as shown in figure 2-5.

3. Lower the tractor cover.

Installing the Ribbon Cartridge

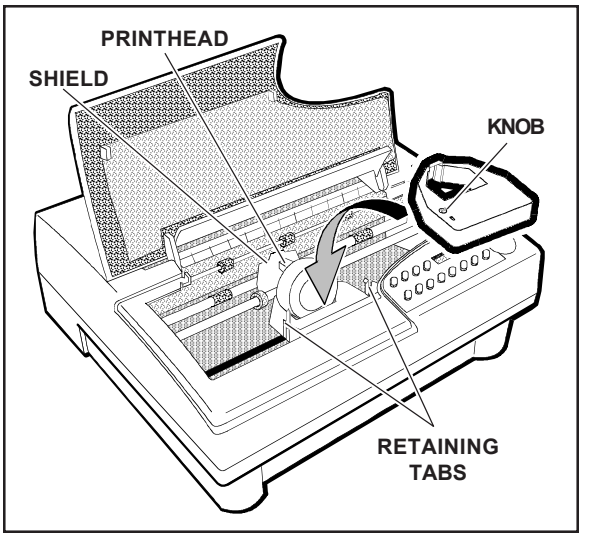


Figure 2-6. Installing a Ribbon Cartridge

Both black and color ribbon cartridges install the same way. To install a ribbon cartridge, use the following procedure:

1. Make sure the printer is off, raise the top cover, and slide the carriage to the center of the printer.
2. If a ribbon cartridge is already installed, remove it by gently pushing outwards on the retaining tabs and lifting the cartridge out of the printer.
3. Remove a new ribbon cartridge from its packaging. Be sure to remove the red ribbon lock from the bottom of the ribbon cartridge. Also, remove any slack in the ribbon fabric by turning the ribbon knob on the cartridge *counterclockwise*.
4. Insert the exposed portion of the ribbon between the printhead and the shield, as shown in figure 2-6.
5. Push down the ribbon cartridge until the retaining tabs snap into place. You may need to turn the ribbon knob slightly to get the cartridge to seat properly.
6. Slide the carriage from side-to-side and make sure the ribbon knob turns. Make sure the exposed ribbon is between the printhead and the shield. Then, lower the top cover.

If you try to print without a ribbon cartridge installed or if the cartridge is installed incorrectly, the message RIBBON ERROR will appear on the control panel to warn you.

Checking the Voltage Select Switch

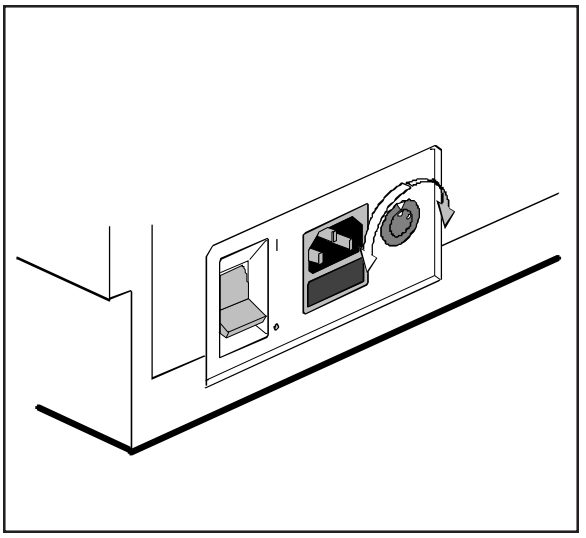


Figure 2-7. Setting the Voltage Select Switch

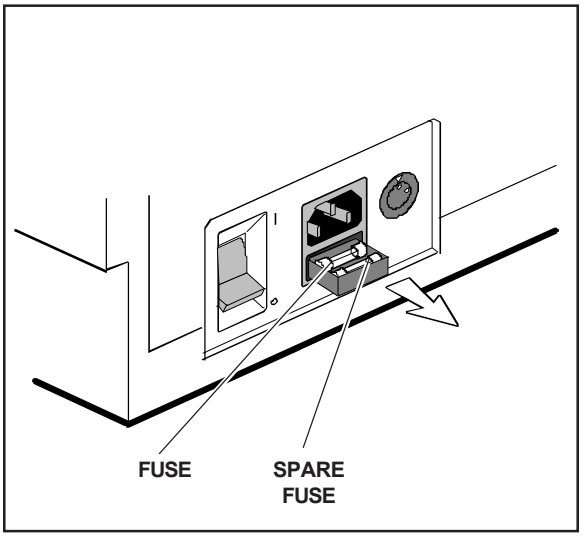


Figure 2-8. Locating the Fuse Compartment

The voltage select switch lets you set up the printer to receive U.S. or international input power. Before attaching the power cable, you must make sure the voltage select switch is set to the correct ac input voltage for your installation. If the voltage select switch is set incorrectly, use the following procedure:

1. Make sure the printer is off.

2. Using a slotted screwdriver, set the voltage select switch to the correct setting, as shown in figure 2-7.

3. Slide open the fuse compartment, as shown in figure 2-8, and check the innermost fuse (the other fuse is a spare).

   ☞**Note:** The serial number label on the side or rear of the printer shows the correct fuse rating for the printer.

4. Close the fuse compartment.

You are now ready to attach the power cord and turn on the printer.

Attaching the Power Cord

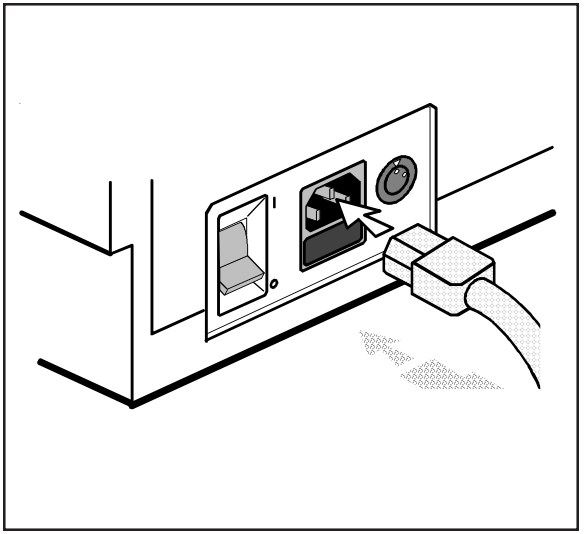


Figure 2-9. Attaching the Power Cord

After checking the voltage select switch, you are ready to attach the power cord. To do so, use the following procedure:

1. Make sure the power switch is off.

2. Take the power cord and plug the three-hole connector into the power receptacle at the rear of the printer, as shown in figure 2-9.

3. Plug the three-prong connector at the other end of the power cord into a properly grounded ac power outlet.

Turning the Printer On and Off

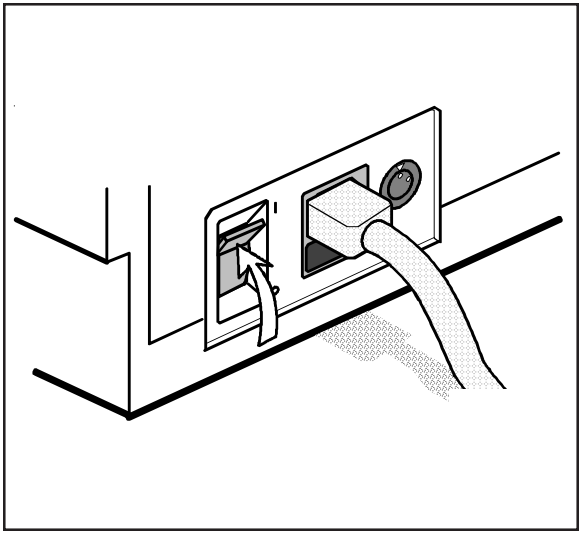


Figure 2-10. Turning On the Printer

To turn on the printer, set the power switch to the **I** position, as shown in figure 2-10.

To turn off the printer, set the power switch to the **O** position.

Cautions:

- ✓ Do not unplug the power cord with the printer turned on.
- ✓ Wait at least five seconds after turning off the printer before turning it back on.

Printing a Self Test

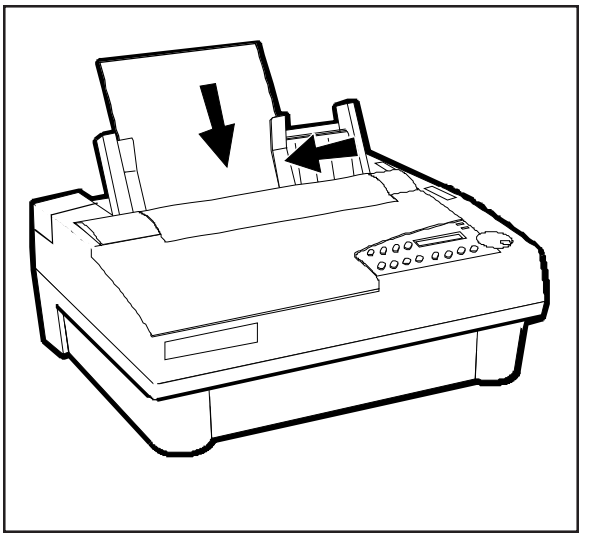


Figure 2-11. Loading a Cut Sheet

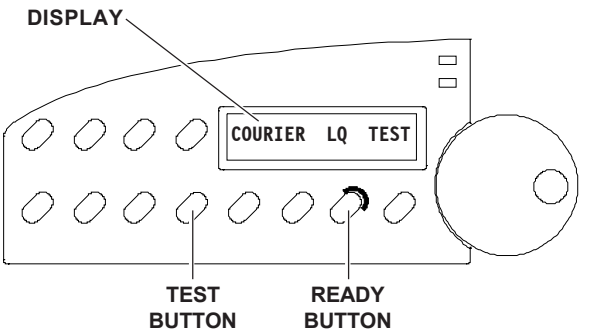


Figure 2-12. Printing a Self Test

Self test lets you verify normal printing operation and inspect print quality. You should print a self test after installing the printer, after preventive maintenance, after extended periods of inactivity, and during troubleshooting when applicable.

To print a self test, perform this procedure:

1. With the paper support raised, squeeze the rear clip on the left paper edge guide and position the guide so that it aligns with the "0" mark ( ) on the ruler.
2. Set a sheet of paper between the paper edge guides, as shown in figure 2-11. Squeeze the rear clip of the right paper edge guide and position it against the right side of the paper.
3. To print an 8-inch-wide self test, press the Test button, as shown in figure 2-12. (Or, to print a self test that is the width of the WIDTH parameter setting on the Setup menu, press the Test button twice in succession.) The paper will feed into the printer, the TEST message will blink on the control panel, and the self test will begin printing.
4. To stop the self test, press the Ready button. The printer will stop printing after completing the current line and the PAUSE message will appear.
5. Inspect the printout. Make sure that the characters are dark and crisp. If the quality is unacceptable, install a new ribbon cartridge and try again.

Attaching the Interface Cable

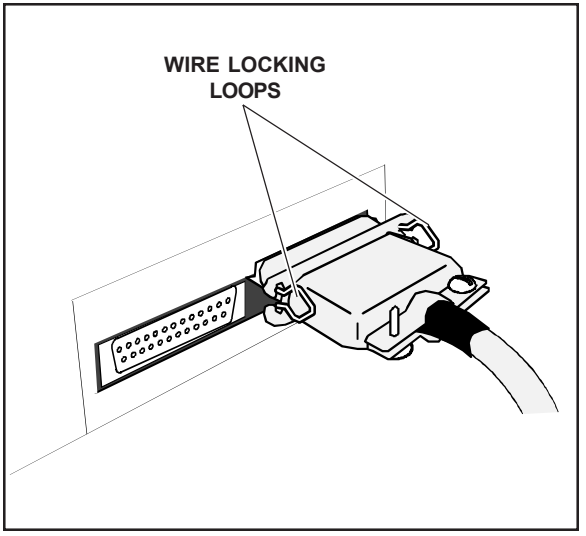


Figure 2-13. Connecting the Parallel Cable

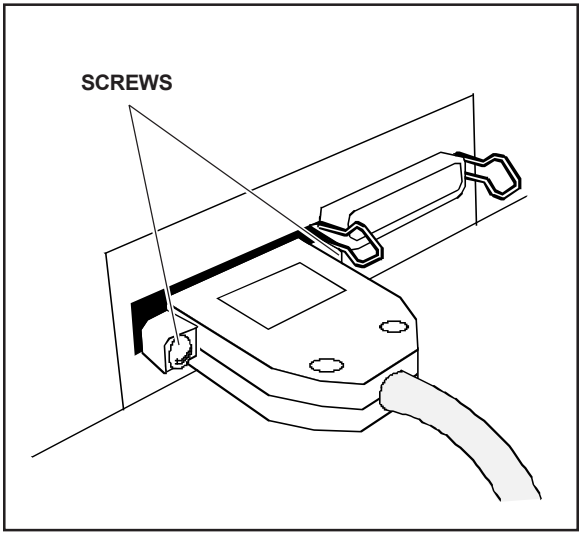


Figure 2-14. Connecting the Serial Cable

The printer has a Centronics®-compatible parallel interface and an EIA RS-232-C-compatible serial interface for communications with computers.

The printer does not come with an interface cable, since the correct cable to use depends on your computer. If you do not already have an interface cable, you can obtain one at a local computer supply store. If you are going to use the parallel interface, the cable must have a 36-pin male Centronics-type connector on the printer end. If you are going to use the serial interface, the cable must have a 25-pin male DB-25 connector on the printer end. The *Interfaces* appendix provides more details.

To connect an interface cable, use the following procedure:

1. Make sure that both your computer and printer are turned off.
2. If you are going to use the parallel interface, plug a parallel cable into the parallel receptacle (see figure 2-13) and lock it into place with the wire locking loops. If you are going to use the serial interface, plug a serial cable into the serial receptacle (see figure 2-14) and use a small slotted screwdriver to tighten the screws that secure the cable to the printer.
3. Connect the other end of the interface cable to the appropriate connector on your computer.

Setting Communications Parameters

When the printer comes from the factory, it is ready to automatically switch between the parallel and serial ports. To use the parallel port, no further action is necessary. If you want to use the serial interface, however, you may need to first set the serial communications parameters on the printer's Setup menu. You'll need to set them so that they match the serial protocol that your computer uses.

The serial communications parameters consist of the following:

- ✓ INTRFCE. Lets you select the active interface: automatic switching, only parallel, or only serial.
- ✓ BAUD. Lets you specify the serial baud rate (that is, the speed of data transmission) that your computer uses.
- ✓ PARITY. Lets you specify the method of parity error checking that your computer uses.
- ✓ DATA BITS. Lets you specify the number of data bits in each serial data byte sent from your computer.
- ✓ STOP BITS. Lets you specify the number of stop bits in each serial data byte sent from your computer.
- ✓ HNDSHK. Lets you specify the handshaking protocol (that is, the method of printer busy notification) that your computer recognizes.

Refer to the *Control Panel* section of this guide for more information on setting communications parameters.

Configuring Software

Your printer is now ready to receive and print data sent from your computer. Configuring most software applications to work with the printer requires only two steps: 1) select the correct printer, and 2) select the correct output port.

Selecting the Correct Printer

Most software applications let you specify the type of printer you're using so that the application can take full advantage of all the printer's features. Many programs provide an installation or setup section that includes a list of printers from which to choose. To print data from your software application, first be sure to select one of the following printers from the list of supported printers:

- ✓ *AMT*
- ✓ *Diablo 630*
- ✓ *Epson JX*
- ✓ *Epson LQ-2550*
- ✓ *IBM XL24 Proprinter*
- ✓ *ASCII text printer*

Select *ASCII text printer* only if none of the other printers are listed. If none of these printers are listed, contact the software manufacturer to inquire about a printer "driver" for one of these printers.

Selecting the Correct Output Port

Most software applications let you specify the output port where your printer is attached, so that the application knows where to send printer output. You normally specify the output port at the same time you specify the correct printer. You *must* specify the correct output port, otherwise printing cannot occur.

If a program does not permit you to specify an output port, it almost always sends data to the computer's line printer port (that is, the first parallel port). Using the proper operating system command, you can redirect all output that goes to the line printer port to any other port. Refer to your operating system manual for further information.

Section

3

Loading Paper

This section describes how to load various kinds of media into the printer, including single sheets, pin-feed paper, multipart forms, labels, and transparencies. If your printer has bottom-feed forms tractors (that is, it is a 6310d or 6350d model), please refer to the appendix *Bottom Feed Tractors* for information on loading paper from the bottom of the printer.

Choosing Paper

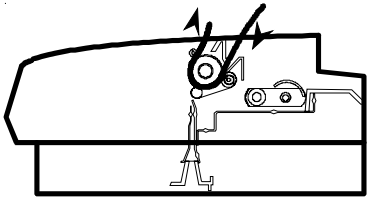
The printer can accommodate many different sizes and types of paper:

- ✓ Media can be from 4 to 17 inches wide on *wide*-carriage printers and from 4 to 12 inches wide on *narrow*-carriage printers. Single sheets must be at least 3 inches long.
- ✓ Multipart forms can have up to seven parts with carbons, and can be up to 0.024 inch thick.
- ✓ Labels and transparencies must also conform to the preceding dimensions. Transparencies require an ink-absorbent coating and paper backing sheets. You can purchase dot-matrix transparency material at most computer and printer supply outlets.

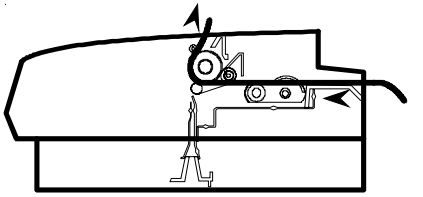
Paper Paths

The printer has three separate paper paths that you can use to load various types of paper.

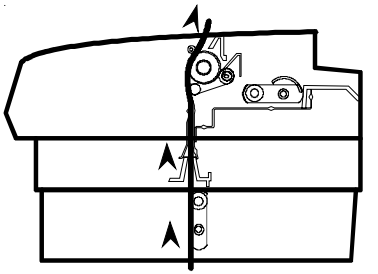
- ✓ *Top path.* You use this path to feed single sheets and forms.



- ✓ *Rear path.* You use this path to feed pin-feed media from the rear of the printer.



- ✓ *Bottom path*. If your printer has bottom-feed forms tractors, you use this path to feed pin-feed media from the bottom of the printer. This bottom path is ideal for thick multipart forms that do not bend easily. The bottom path supports paper movement in both directions.



☞**Note:** If your printer does not have bottom-feed forms tractors, you can purchase a top-pull tractor option that allows you to load pin-feed forms from the bottom of the printer. This option only supports forward paper movement.

Selecting a Paper Path

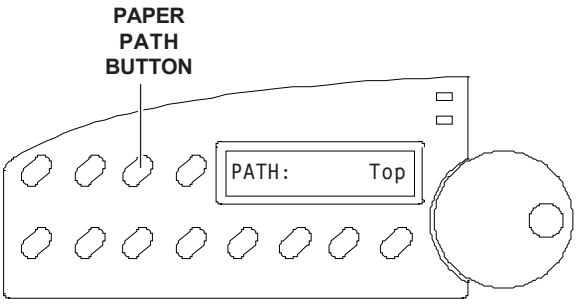


Figure 3-1. Selecting a Paper Path

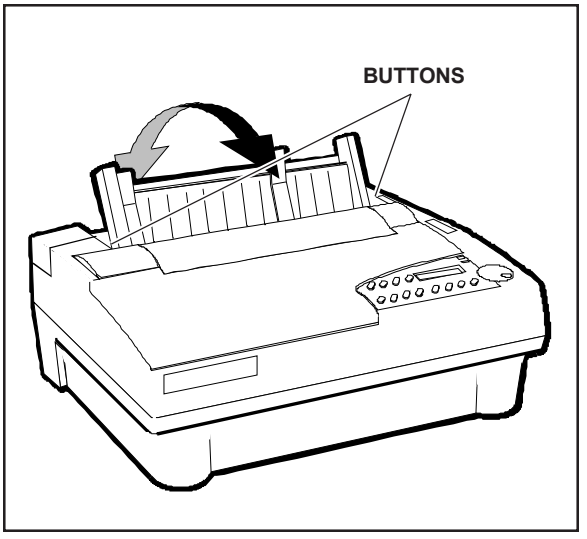


Figure 3-2. Positioning the Paper Support

The tractor select indicator indicates which paper path is selected:

- *Rear position:* In the rear position, the *top* or *bottom* paper path is selected.
- *Front position:* In the front position, the *rear* paper path is selected.

To select a paper path, press the Paper Path button on the control panel (see figure 3-1) to cycle through the paper path selections. The paper path that appears on the control panel display indicates the active path:

PATH: Top
PATH: Rear
PATH: Bottom

After you select a paper path, the tractor select indicator will move to the correct position automatically.

You should then position the paper support, shown in figure 3-2, as follows:

- ✓ When feeding cut sheets into the printer, raise the paper support. It will lock into place automatically.
- ✓ When feeding pin-feed paper, lower the paper support. Push in on the buttons on both sides of the support so it will drop toward the back of the printer.

Loading Single Sheets

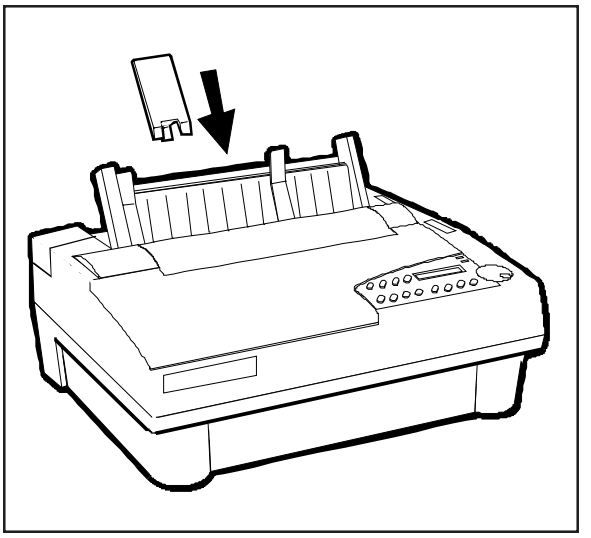


Figure 3-3. Attaching the Support Extender

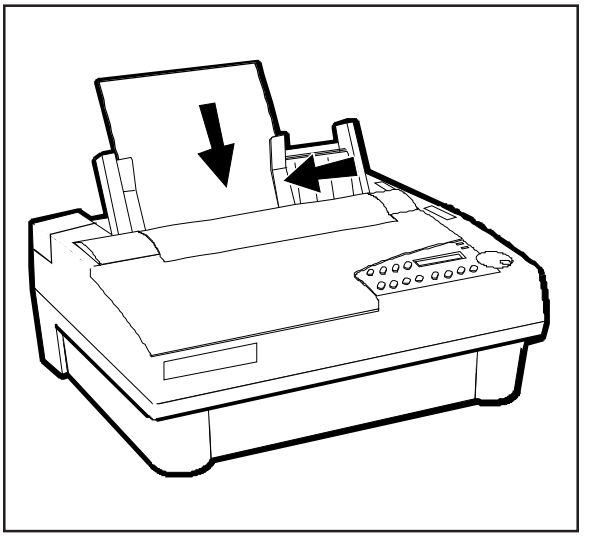


Figure 3-4. Loading a Single Sheet

You load single sheets from the top of the printer. After loading a sheet, the printer automatically positions the sheet to the first printable line. After printing, the printer ejects the sheet. If the printer has more information to print, the LOAD PAPER message appears on the control panel display to notify you.

To load a single sheet, use this procedure:

1. Using the Paper Path button, select the top paper path ( ).
2. Raise the paper support. If necessary for long single sheets, attach the paper support extender, as shown in figure 3-3.
3. Squeeze the rear clip on the left paper edge guide and position the guide so that it aligns with the "0" ( ) on the paper scale.
4. Set a single sheet into the left paper edge guide. Then, squeeze the rear clip on the right paper edge guide and position the guide up against the right edge of the paper, as shown in figure 3-4.
5. Press the Form Feed button. The sheet will advance into the printer.

You can load single sheets with pin-feed paper already loaded, provided that the pin-feed paper is in the *parked* position. You'll learn more about *paper park* later in this section. With a sheetfeeder option, you can load single sheets continually without operator intervention. For information on installing and operating a sheetfeeder option, refer to the *User's Guide* that came with the option.

Positioning a Single Sheet

If necessary, you can reposition a single sheet after loading it. To do so, press the Ready button to disable printing. Then, turn the Select-dial either *clockwise* to advance the sheet or *counterclockwise* to reverse feed the sheet. Then, press the Ready button again to enable printing.

Ejecting a Single Sheet

The printer ejects a single sheet under any of the following conditions:

- ✓ When instructed by your software application.
- ✓ When printing reaches the last print line on the page.
- ✓ When printing reaches the number of lines you or your software application specified for a page.
- ✓ When automatic form feeding is on and printing reaches a half-inch from the bottom of the page.
- ✓ When you press the Form Feed button on the control panel.

Loading Pin-Feed Paper

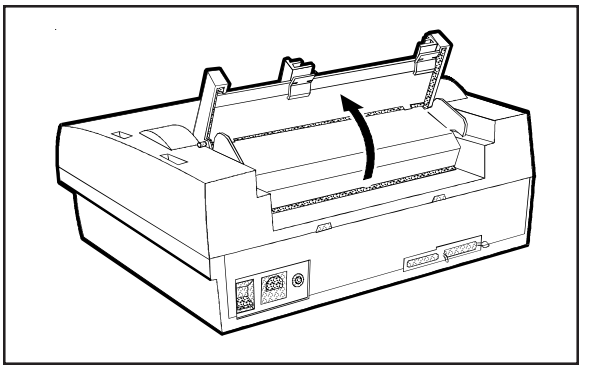


Figure 3-5. Raising the Tractor Cover

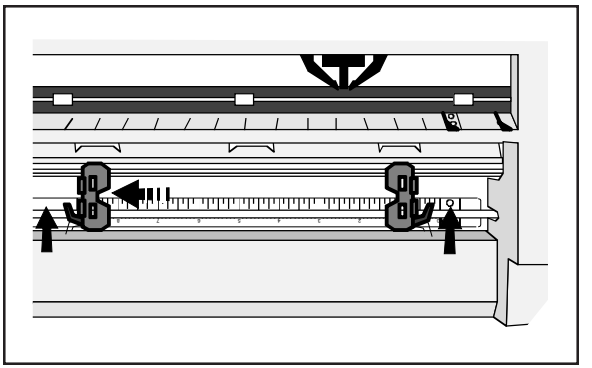


Figure 3-6. Unlocking the Tractors

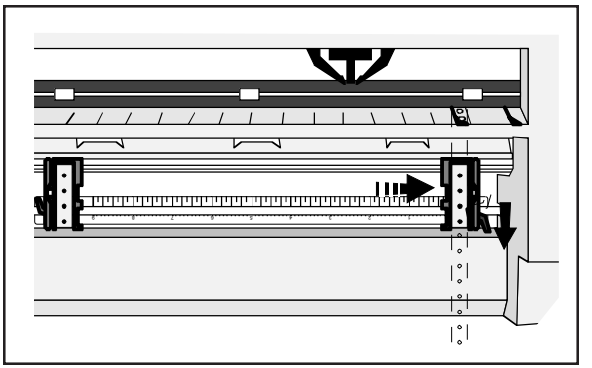


Figure 3-7. Aligning the Left-Edge Tractor

The printer contains two built-in, low-profile tractors that are easy to load. Normally, you load pin-feed paper from the back of the printer. After loading paper, the printer automatically advances the paper to the first printable line. When printing is completed on the first page, the printer advances the paper to the next sheet, again to the first printable line. This cycle continues for as long as the paper supply lasts.

If your printer has bottom-feed forms tractors, please refer to the *Bottom-Feed Tractors* appendix in this guide for information on loading paper from the bottom.

To load pin-feed paper in the printer, use the following procedure:

1. Using the Paper Path button, select the rear paper path ( ).
2. Raise the paper support and tractor cover, as shown in figure 3-5.
3. Unlock both tractors by moving the locking levers, as shown in figure 3-6.
4. Slide the left-edge tractor as needed so that the pin belt aligns with the circles on the paper scale. Then, lock the left-edge tractor into place, as shown in figure 3-7.
5. Open both tractor doors.

Loading Pin-Feed Paper—continued

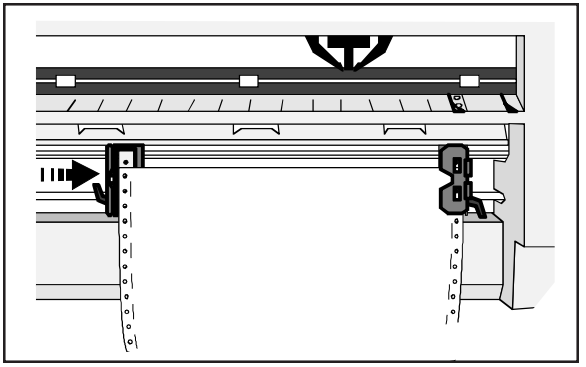


Figure 3-8. Loading Paper Into the Tractors

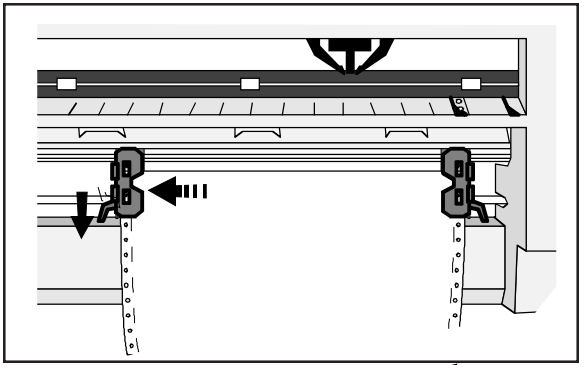


Figure 3-9. Making Sure the Paper is Taut

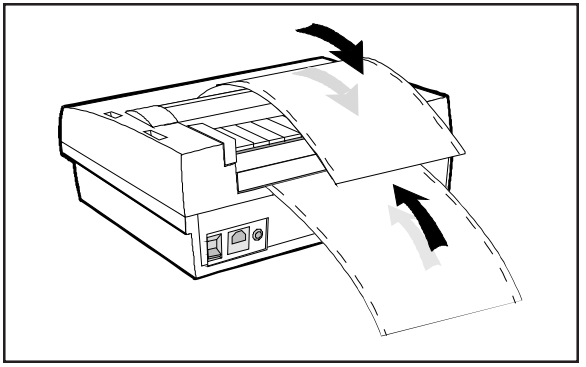


Figure 3-10. Checking the Exit Path

6. Mount the paper onto the first three pins of both tractors, as shown in figure 3-8, and close the tractor doors. You'll need to slide the right-edge tractor left or right as needed until its pin belt aligns with the paper holes.
7. Slide the right-edge tractor as needed to make the paper just slightly taut between the tractors, as shown in figure 3-9. Then, lock the right-edge tractor into place.
8. Lower the tractor cover and paper support.
9. Press the Form Feed button on the control panel. The printer advances the paper to the first printable line. After printing begins, make sure the paper exits the printer over the paper support, as shown in figure 3-10.

Positioning Pin-Feed Paper

Although it is usually unnecessary, you can move pin-feed paper forward or backward after loading it. To move pin-feed paper, press the Ready button to disable printing and then turn the Select-dial. Turning the dial *clockwise* advances the paper; turning the dial *counterclockwise* reverse feeds the paper. After positioning the paper, press the Ready button again to re-enable printing. If you want the printer to feed subsequent pages to the same position, hold down the Alt button and press the Set Top button on the control panel.

Advancing Pin-Feed Paper

The printer advances pin-feed paper to the next sheet under any of the following conditions:

- ✓ When instructed by your software application.
- ✓ When printing reaches the number of lines you or your software application specified.
- ✓ When automatic form feeding is on and printing reaches a half-inch from the bottom of the page.
- ✓ When you press the Form Feed button on the control panel.

Using the Demand Document Mode

A special feature of the printer is the demand document mode. Demand document lets you remove a sheet of pin-feed paper without wasting the next sheet. This is especially useful when printing serialized checks or forms where you must account for each page.

With demand document mode on, pressing the Ready button on the control panel disables printing, flashes the DEMND message (instead of the PAUSE message), and advances the bottom of the last printed page to the top edge of the platen window. You can then tear off and remove the page.

Using the Demand Document Mode—continued

The printer automatically senses whether or not you tear off the page. Pressing the Ready button again causes one of the following actions:

- ✓ If you *removed* the last printed page, the paper reverse feeds to the next top-of-form, the READY message reappears, and printing continues.
- ✓ If you *did not remove* the last printed page, the paper reverse feeds to its original position, the READY message reappears, and printing continues at the point where it left off.

Normally, the demand document mode is off. To turn on the demand document mode, use the following procedure:

`OPERATIONS`	With the printer paused or idle, press the Setup button on the control panel to access the Setup menu.
`35) DEMAND: Off`	Turn the Select-dial until the DEMAND parameter appears on the display.
`35) DEMAND: On`	While holding down the Alt button, turn the Select-dial until *On* appears. Then, release the Alt button.
`COURIER LQ READY`	Press the Setup button again to return to the status message display.

Instead of selecting *On* at the DEMAND parameter, you can select *Beep, Tear* or *Auto.* These options also select the demand document mode, but with special options:

- ✓ *Beep* causes the printer to begin *beeping* 15 seconds after you press the Ready button to pause printing. This *beeping* serves as a reminder to press the Ready button again to re-enable printing.
- ✓ *Tear* causes the printer to reverse feed the paper to the next top-of-form when you re-enable printing, whether or not you actually tear off the last printed sheet. This option is useful when printing thick multipart forms that jam when the leading edge of the form is reverse fed below the printhead.
- ✓ *Auto* causes the printer to advance the bottom of the last printed page to the tear bar whenever the printer is idle—you don't have to press the Ready button. As soon as the printer receives subsequent data to print, the paper reverse feeds as usual.

If you want to stop printing mid-form without advancing the perforation to the tear bar, press the Ready button twice in succession. This disables printing and displays the PAUSE message. Pressing the Ready button again re-enables printing and displays the READY message. These are the normal ready/pause conditions of the printer. You'll learn more about them in the *Control Panel* section of this guide.

Using Paper Park

With the paper park feature, reversing pin-feed paper out of the printer is quick and easy. Reloading paper is even easier. With pin-feed paper parked, you can load a cut sheet.

To park pin-feed paper, use the following procedure:

1. Tear off the last printed sheet at the perforation.

2. Press the Paper Park button on the control panel. The printer reverse feeds the paper until the leading edge of the first sheet is halfway through the tractors.

To reload the pin-feed paper, press the Form Feed button on the control panel. The printer advances the paper to the first printable line.

To load a single sheet, use the Paper Path button to select the top paper path ( ). Then, load the sheet in the usual way (refer to *Loading Single Sheets* in this section).

Unloading Pin-Feed Paper

To unload pin-feed paper, tear off all printed pages that have exited the printer and press the Paper Park button on the control panel. Then, press the Ready button to pause the printer and turn the Select-dial *counter-clockwise* until the pin-feed paper is clear of the tractors.

Loading Multipart Forms

The printer can handle individually-cut or pin-feed forms containing up to seven parts and carbons. The procedures for loading multipart forms are the same as those for loading single sheets and pin-feed paper, except for the following precautions:

- ✓ If your printer has bottom-feed tractors or you have a top-mounted pull tractor option, load forms from the bottom of the printer, especially forms that do not bend easily or tear apart when you bend them. When forms enter the printer from the bottom, they feed straight through the printer without having to bend around the platen.
- ✓ When printing on thick forms, the printer automatically moves the printhead back and increases the print force. These actions usually optimize the print density and increase the readability of multipart forms. Although it is usually unnecessary, you can fine-adjust the print density and print force using control panel functions. You can even disable these automatic functions altogether, if needed. Refer to *Fine Adjusting the Print Density, Set Print Density* and *Set Print Force* in the *Control Panel* section of this guide for more information.

Loading Labels

Your printer can handle individual labels or those with a pin-feed backing sheet. The procedures for loading labels are the same as those for loading single sheets or pin-feed paper, except for the following precautions:

- ✓ When feeding labels, do not use reverse feed, paper park, or use the demand document mode. When labels reverse feed, they can peel off the backing and jam in the printer. To avoid reverse feeding when you are ready to remove labels from the printer, tear them off at a perforation that has not yet entered the printer. Then, press the Form Feed button to eject any labels remaining in the printer.

Loading Labels—continued

- ✓ If your printer has bottom-feed tractors or you have a top-mounted pull tractor option, load labels from the bottom of the printer, especially labels that easily peel off the backing. When labels enter the printer from the bottom, they feed straight through the printer without having to bend around the platen.
- ✓ When printing on labels, the printer automatically moves the printhead back to optimize the print density. Although it is usually unnecessary, you can fine-adjust the print density using the Print Density button on the control panel. Refer to *Fine Adjusting the Print Density* and *Set Print Density* in the *Control Panel* section of this guide for more information.

Loading Transparencies

Your printer can handle individually-cut or pin-feed transparencies made for dot-matrix printers. Dot-matrix transparencies contain an ink-absorbent coating to reduce smearing and a paper backing so printer sensors can detect when a transparency is loaded. The procedures for loading transparencies are the same as those for loading single sheets or pin-feed paper, except for the following precautions:

- ✓ For best results when printing on transparencies, use a fairly new ribbon. A ribbon that is more than half way through its useful life may not transfer enough ink onto the transparency for acceptable projection.
- ✓ When printing on transparencies, the printer automatically moves the printhead back to optimize the print density. Although it is usually unnecessary, you can fine-adjust the print density using the Print Density button on the control panel. Refer to *Fine Adjusting the Print Density* and *Set Print Density* in the *Control Panel* section of this guide for more information.

Aligning Preprinted Forms

When you print on preprinted forms, paper alignment is critical. To align a preprinted form in the printer, use the following procedure:

1. With the printer idle, press the Setup button on the control panel to access the Setup menu. Turn the Select-dial until the POPUP parameter appears. Hold down the Alt button and turn the Select-dial until *On* appears; then release the Alt button. Press the Setup button again.
2. Load the preprinted form into the printer.
3. Press the Ready button to disable printing and then turn the Select-dial as needed to align the first print line on the form with the top edge of the ribbon shield. Then, press the Ready button again.
4. Press the Setup button to access the Setup menu. Turn the Select-dial until the LFT MAR parameter appears on the display.
5. While holding down the Alt button, turn the Select-dial as needed to position the printhead over the first print position on the form. Then, release the Alt button.
6. Press the Setup button again.

Setting Page Length

If the printer's page length setting does not reflect the actual current page length, the following problems can occur:

- ✓ Printing may continue beyond the bottom edge of the page.
- ✓ The page may eject before printing is finished.
- ✓ Pin-feed paper may not advance to the correct top-of-form position. Typically, the amount of error increases in proportion to the number of pages you feed.

Setting Page Length—continued

Ordinarily, software applications set page length for you. If you experience one of these problems, you may have to set the page length manually.

To set the page length, use the following procedure:

1. Press the Setup button on the control panel to access the Setup menu. Then, turn the Select-dial until the LENG parameter appears on the display.
2. While holding down the Alt button, turn the Select-dial until the LENG setting equals the actual page length in 1/6-inch increments. For example, if the actual page length is 14 inches, the setting would be 84/6" (14 x 6). Then, release the Alt button.
3. Press the Setup button to return to the status message.

☞**Note:** The page length setting is defined in one-sixth inch increments regardless of the current lines per inch setting.

Reviewing the Paper Handling Controls

Here's a brief review of the paper handling controls:

- ✓ *Tractor select indicator* shows which paper path is selected. When loading pin-feed paper from the rear, the indicator points towards the *front* of the printer. When loading single sheets or pin-feed paper from the bottom, the indicator points towards the *rear* of the printer. You select a paper path by pressing the Paper Path button.

- ✓ *Forms thickness indicator* shows the current forms thickness. The printer automatically detects forms thickness and adjusts this indicator accordingly.

- ✓ *Form Feed button* feeds a single sheet to the top-of-form, ejects a single sheet, and advances pin-feed paper to the next top-of-form. After a form feed, the line count is zero, except when a top margin is set.

- ✓ *Line Feed button* advances the paper one line space. The actual dis-tance the paper moves for one line space is set by software or from the control panel. You can hold down the Line Feed button for con-tinuous line feeding. With each line feed operation, the line count increases by one.

- ✓ *Set Top button* sets the top-of-form at the current print line. The printer recognizes the current print line as the first line on the page (line 0) and starts counting lines from there.

- ✓ *Paper Path button* lets you select a paper path. After you make your selection, the tractor select indicator will move automatically to the correct position.

Reviewing the Paper Handling Controls—continued

- ✓ *Paper Park button* reverse feeds pin-feed paper until the leading edge of the first sheet is halfway through the tractors. Paper park is the easiest way to unload pin-feed paper from the printer, although it should not be performed with labels or multipart forms. To reload the paper, just press the Form Feed button.

- ✓ *Paper support* helps direct a cut-sheet into the printer and catches the sheet when printing is completed. When using pin-feed paper, the paper support folds down backward to help guide paper exit to the rear of the printer.

- ✓ *Bail* motion is automatic so you will rarely need to manually move the bail. In the event you need to move the bail, press the *Bail button.* This action moves the bail away from the platen so you can clear a paper jam or clean the platen. Pressing this button again moves the bail back against the platen.

- ✓ *Select-dial* has these paper handling functions:

  - With printing paused, turning the dial *clockwise* advances the paper through the printer; turning the dial *counterclockwise* reverse feeds the paper.

  - With printing paused, holding down the Alt button and turning the Select-dial moves the printer carriage. Turning the dial *clockwise* moves the carriage right; turning the dial *counterclockwise* moves the carriage left.

Section

4

Control Panel

This section describes how to use the printer's control panel, which is shown in figure 4-1. The control panel consists of two status lights, a sixteen-character display, twelve buttons, and a Select-dial.

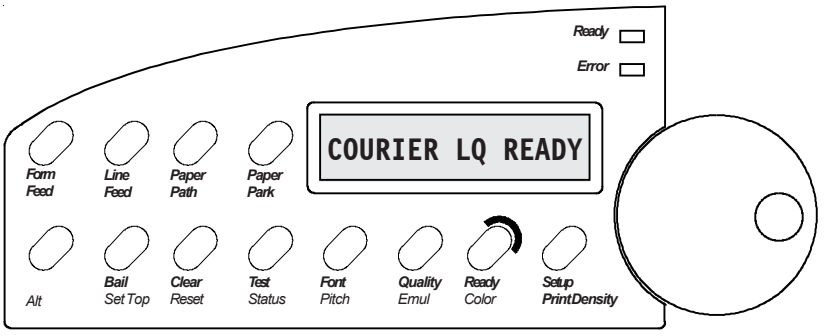
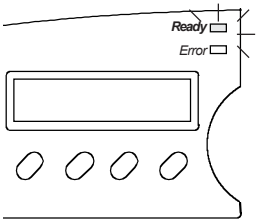


Figure 4-1. Control Panel

Understanding Status Lights

The control panel has two status lights.

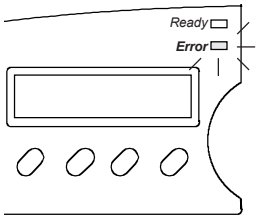
Ready Light



The Ready light indicates the following conditions:

- ✔ When the light is *on*, the printer is ready for normal operation and can receive and print data.
- ✔ When the light *flickers*, the printer is receiving data from the host computer.
- ✔ When the light *flashes*, the printer is performing a self-diagnostic test.
- ✔ When the light is *off*, printing is suspended due to a user action (such as pausing the printer) or an error condition (such as a paper out, ribbon problem or paper jam). When you complete your action or correct the error condition, the light goes on and printing continues.

Error Light



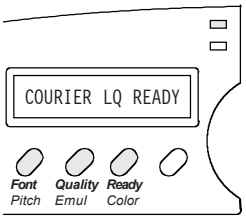
The Error light indicates the following conditions:

- ✔ When the light is *off*, the printer is ready for normal operation and can receive and print data.
- ✔ When the light *flashes*, normal operation is suspended due an error condition. Printing may stop and an error message may appear on the control panel display. To correct the error, you must perform the required action and press the Clear button. If printing is paused, you must also press the Ready button. The *Solving Problems* section of this guide lists error messages and describes the required corrective actions.

Understanding Display Messages

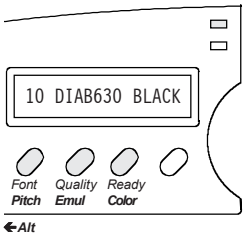
The control panel display can show four kinds of messages.

COURIER LQ READY *Status*



The *status* message appears when you turn on the printer and during normal printing operations. This message shows the current font and print quality, and whether the printer is ready, paused, printing a self test, or in demand document mode. Notice that the button that controls each displayed setting is located just below the displayed setting.

10 AMT BLACK *Alternate Status*



The *alternate status* message appears when you press the Alt button to invoke the alternate function of a button. The alternate function is printed in blue below the button. The message shows the current character pitch (the number of characters per inch), printer emulation, and color. Notice that the button that controls each displayed setting is located just below the displayed setting.

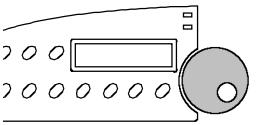
LOAD PAPER *Operator and Error*

Many *operator and error* messages appear to notify you of printer conditions, actions you must take, and errors that occur.

2) SAVE: Usr 1 *Setup Menu*

The *Setup menu* is a list of parameters for operations, printer setup, text appearance, page setup, paper handling, and communications. The menu provides a snapshot view of current printer status. You can change settings as required, then save the settings for use at a later time. You can also specify the power-on default settings. You'll learn more about the Setup menu later in this section.

Using the Select-Dial



You turn the Select-dial to move the paper up and down, move the carriage back and forth, scroll through the Setup menu, and fine adjust the print density.

Moving the Paper Up and Down

To move the paper up and down, press the Ready button to disable printing and then turn the Select-dial. To advance the paper, turn the dial *clockwise*; to reverse-feed the paper, turn the dial *counterclockwise*. After moving the paper, press the Ready button again to re-enable printing. When you move the paper with the dial, printer logic does not change the internal line count. This enables you to decide where the first print line should be and where line counting begins.

Moving the Carriage Back and Forth

To move the carriage back and forth, first press the Ready button to disable printing. Then, hold down the Alt button and turn the dial. To move the carriage to the right, turn the dial *clockwise*; to move the carriage left, turn the dial *counterclockwise*. You may have to move the carriage to install a ribbon cartridge or clear a paper jam. Moving the carriage does not affect the print position. When printing begins, the carriage moves back to its original position.

Scrolling Through the Setup Menu

Whenever the Setup menu is displayed, you use the Select-dial to scroll through the menu and make selections. You'll learn how use the Setup menu later in this section.

Fine Adjusting the Print Density

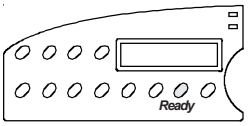
To fine adjust the print density, hold down the Print Density button and turn the Select-dial. A print density adjustment scale appears on the display to show you the adjustment range. To make printing darker, turn the dial *clockwise*; to make printing lighter, turn the dial *counterclockwise.* This adjustment is effective only when the printer is in the automatic print density mode. The printer retains this adjustment even when turned off.

Using the Control Panel Buttons

You press the buttons to set printer parameters and perform operations. A brown function label is printed below each button to remind you of its primary function and a blue label to remind you of its alternate function. To invoke the primary function of a button, just press the button. To invoke the alternate function of a button, hold down the Alt button and press the button.

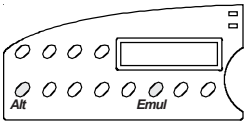
Only the Ready button operates while printing is in progress. To use any other button while printing, you must first press the Ready button and wait for printing to pause. When you change a printer setting with a control panel button, the printer *beeps* to confirm the change.

Turning Printing On and Off



Pressing the Ready button turns printing (and the Ready light) either on or off and displays either READY or PAUSE. With READY displayed, the printer is free to print any data it receives. With PAUSE displayed, printing cannot occur. If you press the Ready button while printing is in progress, printing will stop after printing up to three more lines. When you press the Ready button again, printing will resume where it left off.

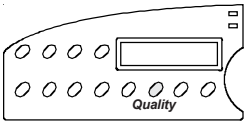
Selecting a Printer Emulation



Holding down the Alt button and pressing the Emul button selects the next available printer emulation and displays the name of the printer being emulated. The emulations you can choose from consist of those in the installed Intelli-card. On standard printers you can select from the following emulations: AMT (AMT's native mode), DIAB630 (Diablo 630 daisywheel printer), EPSONJX (Epson JX color dot-matrix printer), EPSONLQ (Epson LQ-2550 color dot-matrix printer), IBMXL24 (IBM Proprinter XL24 color dot-matrix printer), BARCODE (Epson LQ-2550 with additional bar coding features), and HEXMODE (hexadecimal printouts of printer data). When you change the emulation from the control panel, the printer retains the current settings, but clears the data input buffer.

☞**Note:** Emulations allow your printer to operate just like printers from other manufacturers, such as Epson or IBM. Emulations enable the printer to be compatible with a wider range of software applications.

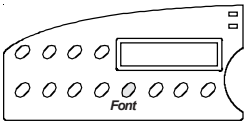
Selecting a Text Quality



Pressing the Quality button selects the next text quality and displays one of the following: LQ for letter-quality, MQ for memo-quality, or DQ for draft-quality.

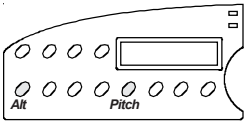
The actual print speed for each text quality depends on the printer's settings for pitch, color, quiet mode, and print direction.

Selecting a Font



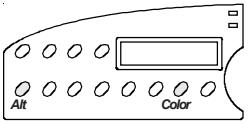
Pressing the Font button selects the next available font (type style) and displays the font name. On standard printers you can select from the following fonts: COURIER (a fixed-pitch serif font), GOTHIC (a fixed pitch sans-serif font), TMSROMN (a proportionally-spaced serif font), and ELITE (a fixed-pitch serif font). Each font has a default pitch, which is the number of characters per inch that you normally use to print the font. When you select a font, pitch changes to the default pitch of that font.

Selecting a Pitch



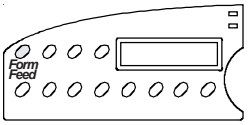
Holding down the Alt button and pressing the Pitch button selects the next available pitch (number of characters per inch) and displays the pitch setting. You can select 10, 12, 13 (actually 13.3), 15, 17 (actually 17.1) or 20 characters per inch. You can also select PS for proportional-spacing. If your software application sets the pitch to some nonstandard value, such as 5- or 8-pitch, NS (for nonstandard) appears as the current pitch. When you select a pitch, characters in the current font expand or compress to fit the new spacing.

Selecting a Color



Holding down the Alt button and pressing the Color button selects the next available color and displays the name of the color. You can select BLACK, CYAN (light blue), MGNTA (magenta), YELLW (yellow), VIOLT (violet), GREEN, or ORANG (orange). If a monochrome ribbon is installed in the printer, you can select only BLACK.

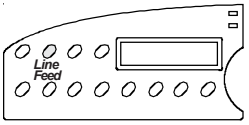
Form Feeding



Pressing the Form Feed button causes one of the following actions to occur:

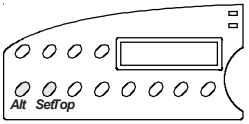
- ✓ If you are loading a single sheet, the sheet advances to the top-of-form.
- ✓ If a single sheet is already loaded, the sheet ejects.
- ✓ If you are loading or using pin-feed paper, the paper advances to the next top-of-form.

Line Feeding



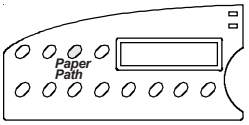
Pressing the Line Feed button advances the paper one line space. Holding down the Line Feed button causes continuous line feeding. The actual distance that the paper advances for a line feed depends on the current lines per inch (lpi) setting. As you line feed, the printer increments the internal line count. If you use the Line Feed button to move paper to the top-of-form, you must hold down the Alt button and press the Set Top button to initialize the line count to zero.

Setting the Top-of-Form



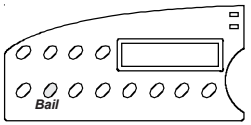
Holding down the Alt button and pressing the Set Top button sets the top-of-form at the current print line. When you set a top-of-form, the printer recognizes the current print line as the first line on the page (line 0) and starts counting lines from that point.

Selecting a Paper Path



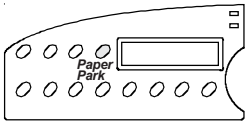
Pressing the Paper Path button lets you select one of the available paper paths for subsequent paper feeding. When you first press the Paper Path button, the current paper path appears on the control panel display. Pressing the Paper Path button again cycles through the available paper paths: Top, Rear, or Bottom (if your printer has a powered bottom-feed forms tractor). After you make your selection, the tractor select indicator moves to appropriate position automatically.

Moving the Bail



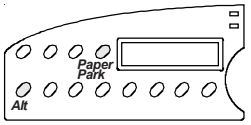
Pressing the Bail button moves the bail back and forth. During normal printing operations, it is *not* necessary to use the Bail button since the bail moves automatically.

Parking the Paper



Pressing the Paper Park button with pin-feed paper loaded in the printer causes the paper to reverse-feed until the top edge of the first sheet is halfway through the tractors. Before pressing the Paper Park button, however, tear off the last printed sheet that has fed beyond the tear bar. With paper park, removing pin-feed paper from the printer is quick and easy. To reload paper, just press Form Feed.

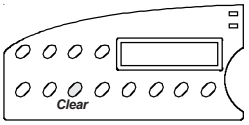
Restoring Printer Settings



Holding down the Alt button and pressing the Paper Park button lets you restore printer settings to the factory (*Fctry*) settings or to the settings you saved previously under one of five user names (*Usr 1* to *Usr 5*). When you first press the Alt and Paper Park buttons, the current user name appears on the control panel display. If you continue to hold down the Alt button and press the Paper Park button again, you can cycle through the available user names. If you release the Alt button with the current user name displayed, this function is cancelled. If you release the Alt button with another user name displayed, the printer settings saved under that user name take effect.

☞**Note:** For more detailed information on this function, refer to *Restore Printer Settings* and *Save Printer Settings* later in this section.

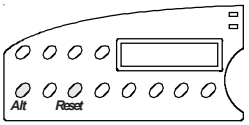
Clearing Messages and the Buffer



Pressing the Clear button causes one of the following actions to occur:

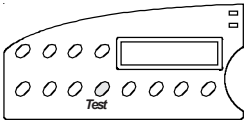
- ✔ If an error or warning message is displayed, the normal status message reappears.
- ✔ If the normal status message is displayed, the printer erases all data that has been received but not yet printed. Since the printer receives incoming data faster than it can print it, the printer temporarily stores data in a buffer in memory. If you turn printing off or an error occurs, you can erase all of the data in the buffer waiting to be printed. Clearing the buffer does not reset any printing parameters; all of the current settings remain in effect.

Resetting the Printer



Holding down the Alt button and pressing the Reset button resets printer logic, clears the input buffer, and initializes all printing parameters to the defaults. Using the Reset button is like turning the printer off and then back on.

Printing a Self Test

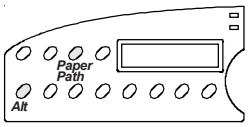


Pressing the Test button prints an 8-inch wide test pattern of some of the characters in the current font (ASCII codes 32 to 127), using the current print modes. To print a test pattern that is as wide as the WIDTH parameter setting on the Setup menu (you'll learn more about this parameter later in this section), press the Test button twice in succession. To terminate the test, press the Ready button.

```
¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
opqrstuvwxyz{|}~¬¢!"#$%&'()*+,-.0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
_`abcdefghijklmnopqrstuvwxyz{|}~¬¢!"#$%&'()*+,-.0123456789:;<=>?@ABCDEFGHIJKLMN
OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~¬¢!"#$%&'()*+,-.0123456789:;<=>
```

Printing a self test is a convenient way to check that your printer is operating normally and that print quality is acceptable. Also, you can view many of the available characters in the current font.

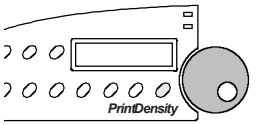
Resetting Optimal Print Density



Holding down the Alt button and pressing the Paper Path button resets the position of the printhead for optimal print density. Since the printer per-forms this function automatically, you only need to use it if you accidentally bump the printhead.

☞**Note:** If automatic forms thickness detection is disabled, holding down the Alt button and pressing the Paper Path button causes the printer to reset the printhead to a user-defined position. Refer to *Set Print Density* later in this section.

Fine Adjusting the Print Density



Each time you load a new form in the printer, the printhead automatically moves a fixed distance away from the form. This fixed distance is factory-set to provide optimal print density on most forms. You can fine adjust this distance if you prefer a slightly lighter or darker print. To do so:

Hold down the Print Density button until the print density adjustment scale appears.

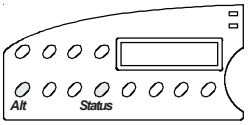
For darker print, turn the Select-dial *clockwise*. The offset indicator will move to the right.

For lighter print, turn the Select-dial *counterclockwise*. The offset indicator will move to the left.

The printer retains this adjustment even when turned off.

☞**Note:** If you try to access the adjustment scale with automatic forms thickness detection disabled, the message MANUAL PHGAP SET appears instead. Refer to *Set Print Density* later in this section for more information.

Printing Printer Status Reports



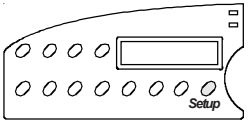
Holding down the Alt button and pressing the Status button *once* prints a *Printer Status Report*. This report includes a list of the available printer emulations and fonts, and a printout of the Setup menu with the current settings.

Holding down the Alt button and pressing the Status button *twice* prints an extended *Printer Status Report*. This report includes all of the information on the standard report plus the Setup menu settings for each user save area and the normally hidden settings.

To terminate the printing of a report before it finishes, just press the Ready button. Printing will stop after up to three more lines print.

A sample *Printer Status Report* and extended *Printer Status Report* are shown on the next pages. The settings in these examples are the factory-set defaults for the ACCEL-6310. The factory-set defaults for other models vary slightly. On the sample extended *Printer Status Report*, notice that only the settings in the user save areas that *differ* from the current setting are printed on the report. This allows the report to print faster than if every duplicate setting was printed. Since the Setup menu is updated from time-to-time, your report may include additional parameters and be numbered differently. Each parameter and setting is described later in this section.

Displaying the Setup Menu



Pressing the Setup button displays the Setup menu. From the Setup menu, you can view and change most printer settings. If you display but do not use the Setup menu for more than one minute, the status message will reappear automatically. Next, you'll learn more about the Setup menu.

```
                         AMT PRINTER STATUS REPORT
_______________________________________________________________________________

        MODEL:  ACCEL-6310
     FIRMWARE:  389008-010-E
   EMULATIONS:  AMT Diab630 EpsonJX EpsonLQ IBMXL24 Barcode HexMode
        FONTS:  Courier Gothic TmsRomn Elite
_______________________________________________________________________________

                OPERATIONS            TEXT APPEARANCE           PAPER HANDLING

            1)  RSTOR:     None     12)  QUAL:    Letter     33)  PATH:       Top
            2)  SAVE:      None     13)  FONT:   Courier     34)  LFSLEW:    6ips
            3)  DFALT:    Fctry     14)  PITCH:       10     35)  DEMAND:     Off
            4)  TEST:      None     15)  CELL:        10     36)  PPR JAM:     On
                                    16)  LPI:          6     37)  PGE END:    Off
              PRINTER SETUP         17)  COLOR:    Black     38)  POPUP:      Off
                                    18)  ITALICS:    Off     39)  AUTOBAIL:   Off
            5)  EMUL:       AMT     19)  HIGH:       Off     40)  PH GAP:    Auto
            6)  QUIET:      Off     20)  WIDE:       Off     41)  PFORCE:    Auto
            7)  LANG:       USA     21)  SCRIPT:     Off
            8)  SETS:      IBM1     22)  UNDLINE:    Off        COMMUNICATIONS
            9)  AUTO CR:    Off     23)  BLD/SHA:    Off
           10)  AUTO LF:    Off     24)  SLASH-0:    Off     42)  INTRFCE:   Auto
           11)  ERRBEL:    Once     25)  BI-DIR:    Text     43)  BAUD:      9600
                                                             44)  BUFFER:     48K
                                          PAGE SETUP         45)  HNDSHK:     D/X
                                                             46)  DATA BITS:    8
                                    26)  LENG:     66/6"     47)  STOP BITS:    1
                                    27)  WIDTH:     8.5"     48)  PARITY:    None
                                    28)  TOP MAR:      0     49)  DTR:        Pos
                                    29)  BOT MAR:     66     50)  STROBE:     Neg
                                    30)  LFT MAR:      0
                                    31)  RGT MAR:     85
                                    32)  AUTO FF:    Off
_______________________________________________________________________________
```

Figure 4-2. Sample *Printer Status Report*

```
                         AMT PRINTER STATUS REPORT
_______________________________________________________________________________

        MODEL:  ACCEL-6310
     FIRMWARE:  398008-010-E
   EMULATIONS:  AMT Diab630 EpsonJX EpsonLQ IBMXL24 Barcode HexMode
        FONTS:  Courier Gothic TmsRomn Elite
_______________________________________________________________________________

CURRENT SETTINGS          Factory     Usr 1      Usr 2      Usr 3      Usr 4      Usr 5

     OPERATIONS

 1)  RSTOR:     None         None
 2)  SAVE:      None         None
 3)  DFALT:    Fctry        Fctry
 4)  TEST:      None         None

   PRINTER SETUP

 5)  EMUL:       AMT          AMT   Diab630    EpsonLQ    IBMXL24    Barcode    Hexmode
 6)  QUIET:      Off          Off        On
 7)  LANG:       USA          USA    Latin1
 8)  SETS:      IBM1         IBM1      IBM2
 9)  AUTO CR:    Off          Off
10)  AUTO LF:    Off          Off
11)  ERRBEL:    Once         Once
```

Figure 4-3. Sample Extended *Printer Status Report*

CURRENT SETTINGS	Factory	Usr 1	Usr 2	Usr 3	Usr 4	Usr 5
TEXT APPEARANCE						
12) QUAL:	Letter	Draft				
13) FONT:	Courier	Gothic				
14) PITCH:	10	12				
15) CELL:	10	12				
16) LPI:	6					
17) COLOR:	Black	Green				
18) ITALICS:	Off	On				
19) HIGH:	Off					
20) WIDE:	Off					
21) SCRIPT:	Off					
22) UNDLINE:	Off					
23) BLD/SHA:	Off					
24) SLASH-0:	Off					
25) BI-DIR:	Text	Off				
PAGE SETUP						
26) LENG:	66/6"					
27) WIDTH:	8.5"					
28) TOP MAR:	0					
29) BOT MAR:	66					
30) LFT MAR:	0					
31) RGT MAR:	85					
32) AUTO FF:	Off					
PAPER HANDLING						
33) PATH:	Top	Rear	Bottom			
34) LFSLEW:	6ips	10ips				
35) DEMAND:	Off					
36) PPR JAM:	On					
37) PGE END:	Off					
38) POPUP:	Off					
39) AUTOBAIL:	Off					
40) PH GAP:	Auto					
41) PFORCE:	Auto					
COMMUNICATIONS						
42) INTRFCE:	Auto					
43) BAUD:	9600					
44) BUFFER:	48K					
45) HNDSHK:	D/X					
46) DATA BITS:	8					
47) STOP BITS:	1					
48) PARITY:	None					
49) DTR:	Pos					
50) STROBE:	Neg					
HIDDEN ITEMS						
51) RIBBON:	-5	0				
52) PTOP:	-2/60"	0/60"				
53) TEAR:	0/30"	-2/30"				
54) HOME:	6/120"	0/120"				
55) PTHRESH:	177	211				
56) UNAMS:	None	None				
57) PANEL:	Unlock	Unlock				

Figure 4-3. Sample Extended *Printer Status Report*—continued

Using the Setup Menu

The Setup menu is a selection list of printer parameters organized into the following catagories:

- ✓ Operations
- ✓ Printer Setup
- ✓ Text Appearance
- ✓ Page Setup
- ✓ Paper Handling
- ✓ Communications

When the Setup menu appears, the control panel display acts like a one-line window over the menu. Each line contains a different parameter. Turning the Select-dial scrolls the menu up or down below the window. Each parameter is numbered so you can always tell where you are in the menu.

Next to each parameter is the current setting for that parameter. Holding down the Alt button and turning the Select-dial cycles through the possible settings. The setting that is displayed when you release the Alt button becomes the current setting. When you change a setting, the printer *beeps* to confirm the change.

To leave the Setup menu and redisplay the status message, press the Setup button again. If you display the Setup menu but do not use it for more than one minute, the status message reappears automatically.

You can change the current settings as required, then save them for use at a later time. You can also specify the power-on defaults for the printer to use. You can print the Setup menu using the Status button.

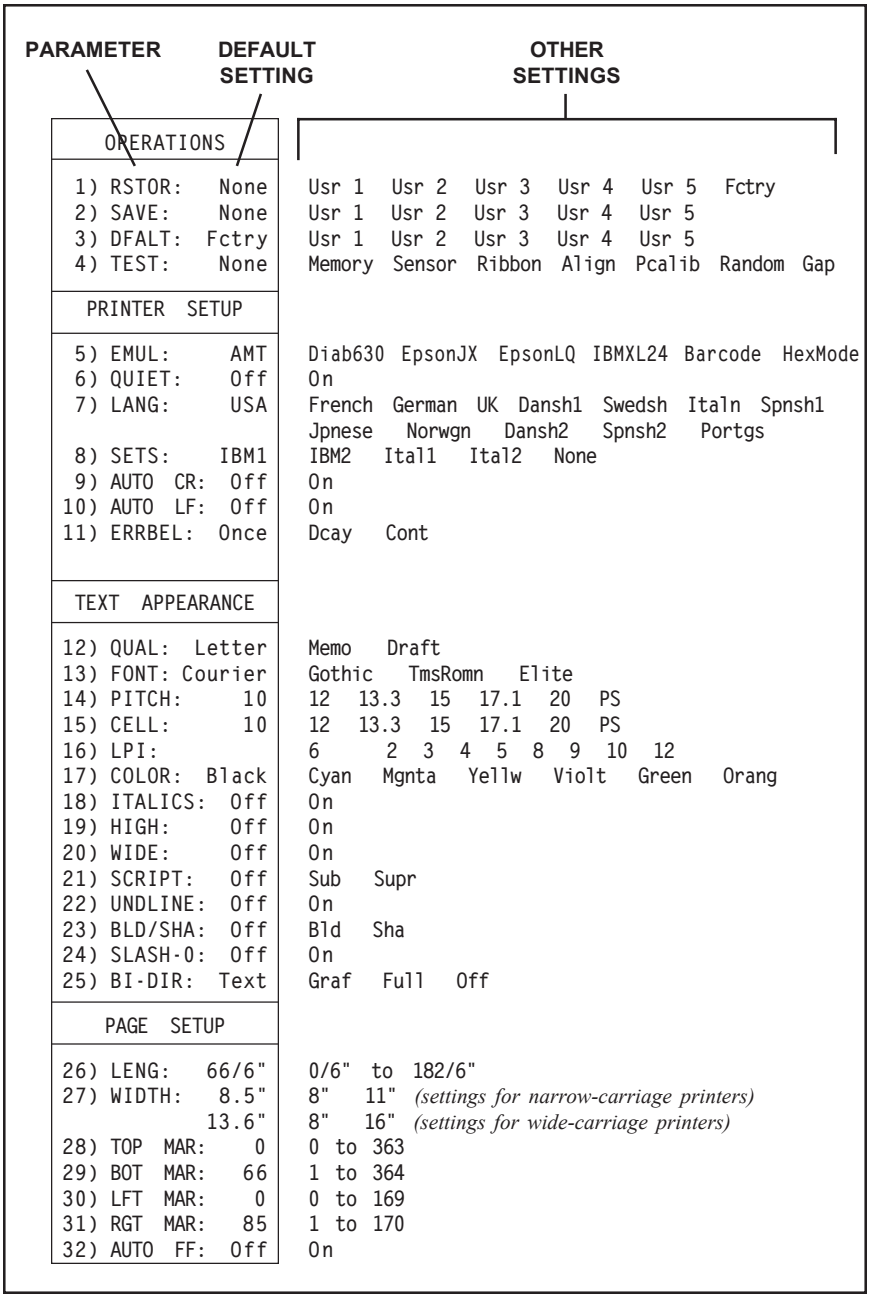


Figure 4-4. Setup Menu

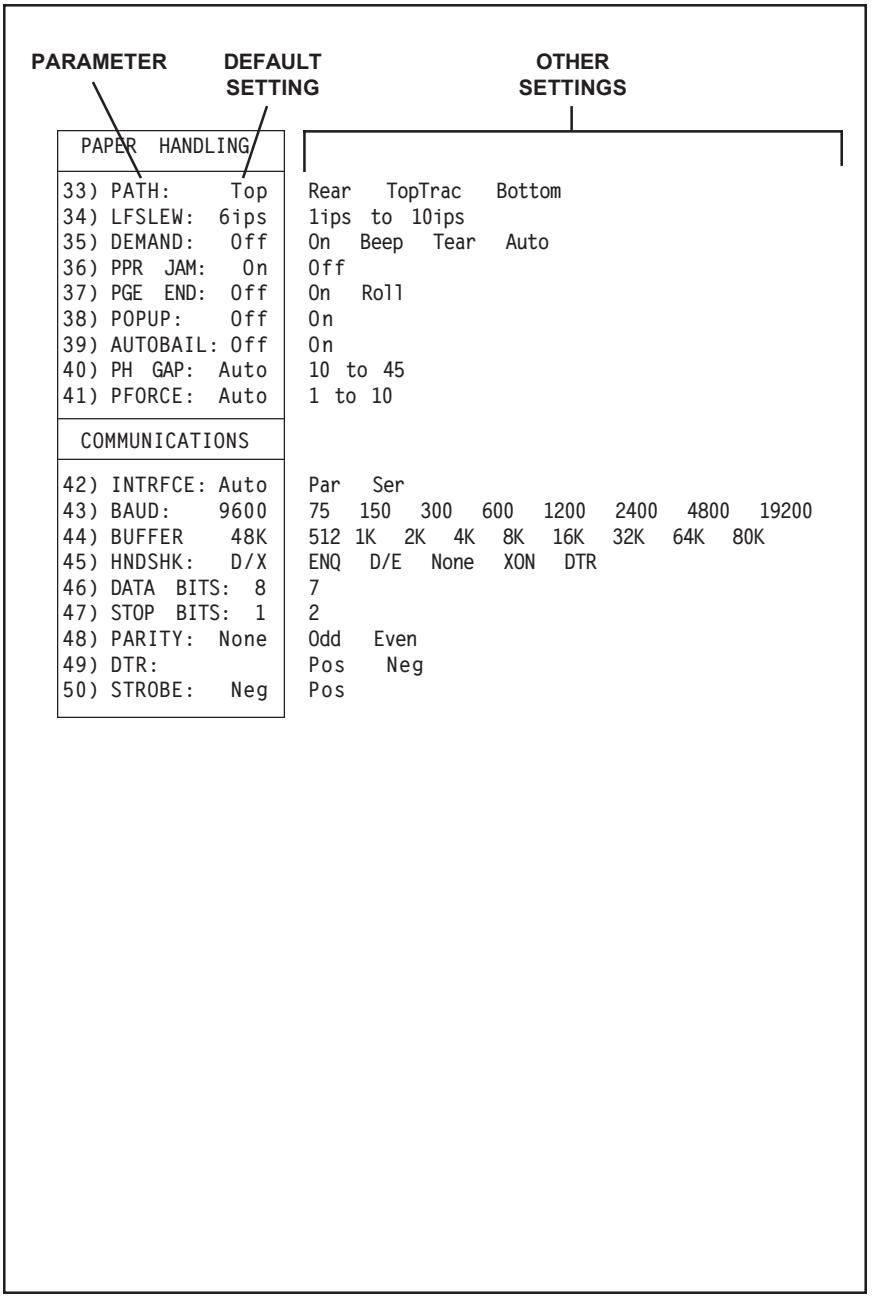


Figure 4-4. Setup Menu—continued

Using the Setup Menu—continued

☞**Note:** Learning Setup menu functions is *not* necessary. These functions are provided for users who want to explore the advanced capabilities of the printer. During normal printing, application programs control most Setup menu functions automatically.

Before describing the parameters on the Setup menu, let's review how to display, scroll through, and change settings on the Setup menu:

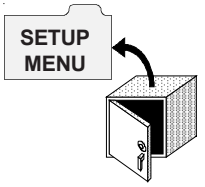
`OPERATIONS`	With the status message displayed, press the Setup button; the Setup menu appears.
`12) QUAL:Letter`	Turn the Select-dial until the parameter you want to change appears.
`12) QUAL: Draft`	While holding down the Alt button, turn the Select-dial to view the possible settings for the parameter. When the setting you want to select appears, release the Alt button. The printer *beeps* to confirm the setting change.
`COURIER DQ READY`	Turn the Select-dial to display another parameter or press the Setup button to redisplay the status message.

Now that you know how to use the Setup menu, it is time to learn what each parameter does and the possible settings you can select. Parameters are described in the order they appear in the Setup menu.

Performing Operations

The first section on the Setup menu is operations. Selecting an operation performs a specific action.

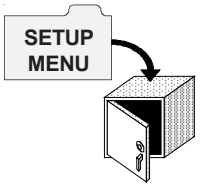
1) RSTOR: None *Restore Printer Settings*



RSTOR lets you restore printer settings to the factory settings or to settings you saved previously with a SAVE operation. When you use RSTOR, the printer clears the data input buffer. You can select *None* to cancel the operation; *Fctry* to restore the factory settings; or *Usr 1* through *Usr 5* to restore the settings saved under one of these names.

☞**Note:** You can rename the five user areas so that they are more mean-ingful to your particular applications. Refer to *Changing User Names* in the *Solving Problems* section of this guide for more information.

2) SAVE: None *Save Printer Settings*

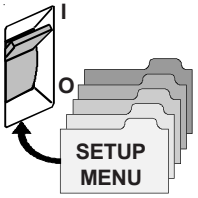


SAVE lets you save the current printer settings in non-volatile memory for use at a later time. Non-volatile memory retains information even when the printer is turned off.

To save the current printer settings, hold down the Alt button and turn the Select-dial to select one of the five user names. As soon as you release the Alt button, the printer saves the current printer settings and assigns the user name that you select. You can use RSTOR to restore the settings you save; you can use DFALT to make your saved settings the power-on default settings. You can select *None* to cancel the operation; or *Usr 1* through *Usr 5* to save the current settings under one of these names.

☞**Note:** You can rename the five user areas so that they are more mean-ingful to your particular applications. Refer to *Changing User Names* in the *Solving Problems* section of this guide for more information.

3) DFALT: Fctry *Select Power-On Default Settings*



DFALT lets you select the printer settings to use as the power-on default settings. You can select the factory settings or the settings you saved previously with a SAVE operation. The printer keeps your DFALT selection in non-volatile memory so it is retained when the printer is off.

You can select *Fctry* to use the factory settings as the power-on defaults; or *Usr 1* through *Usr 5* to use the settings saved under one of these names.

☞**Note:** You can rename the five user areas so that they are more mean-ingful to your particular applications. Refer to *Changing User Names* in the *Solving Problems* section of this guide for more information.

4) TEST: None *Run Printer Tests*

TEST lets you run a variety of printer tests. If a test is unsuccessful, an error message appears to notify you.

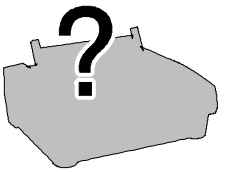
You can select *None*, which is always the default and does not perform any test; *Memory*, which checks the printer memory; *Sensor*, which runs the sensor check; *Ribbon*, which performs a ribbon alignment print test; *Align*, which performs a printing alignment test; *Pcalib*, which recalibrates the sensitivity of the paper sensor; *Random*, which performs a random carriage movement print test; or *Gap*, which prints the printhead gap values measured across and around the surface of the platen. Printer tests are described in detail in the *Solving Problems* section of this guide.

☞**Note:** Field service technicians use these printer tests to diagnose problems and re-adjust the printer.

Using Printer Setup Parameters

The second section on the Setup menu is printer setup. The most important printer setup parameter is emulation, which *must* be set so that it is compatible with your application program.

5) EMUL: AMT *Set Printer Emulation*

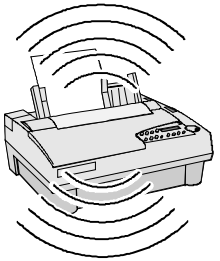


EMUL lets you select a printer emulation for the printer to use. Selecting an emulation enables the printer to print data that is formatted for other popular printers. This makes the printer compatible with a wider range of software applications, including those that are not directly compatible with these printers. The emulations you can choose from depend on those loaded in FLASH memory. On standard printers, you can select from the following emulations:

- ✓ *AMT*. This is the printer's native language.
- ✓ *Diab630*. This is the Diablo 630 daisywheel printer.
- ✓ *EpsonJX*. This is the Epson JX color dot-matrix printer.
- ✓ *EpsonLQ*. This is the Epson LQ-2550 color dot-matrix printer.
- ✓ *IBMXL24*. This is the IBM Proprinter XL24 color dot-matrix printer.
- ✓ *BarCode*. This is the printer's internal bar code emulation. When you select this emulation, the printer emulates the Epson LQ-2550 but also provides bar code printing. Refer to the *Bar Codes* appendix of this guide for more information.
- ✓ *HexMode*. This selects the hexadecimal mode wherein the printer prints the hexadecimal and ASCII representation of every byte it receives instead of actually interpretting and printing the data. This function is useful when you need to view the actual codes being sent from the host computer to the printer.

```
0000:   41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50   ABCDEFGHIJKLMNOP
0010:   51 52 53 54 55 56 57 58 59 5A 5B 5C 5D 5E 5F 60   QRSTUVWXYZ[\]^_`
```

Always select a printer emulation that is supported by your software. When you change the emulation using this parameter, the printer retains the current settings but clears the data input buffer.



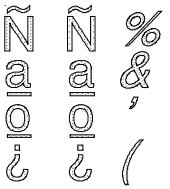
6) QUIET: Off *Turn Quiet Mode On and Off*

QUIET lets you turn the quiet mode on and off. In quiet mode, the print speed slows down by about 40% in draft (DQ) mode and 50% in memo (MQ) and letter (LQ) modes. Slowing the print speed decreases the amount of noise that is generated. You can select *On* to turn the quiet mode on or *Off* to turn the mode off.

7) LANG: USA *Set Language*

LANG lets you specify a language for the printer to use when printing text. When you select any language other than *USA*, the printer replaces some of the standard ASCII printable characters with alternate characters that are used in a specific language. You can select the following:

Setting	*Country*	*Character Replacements*											
USA	USA	#	$	@	[	\	]	^	`	{	|	}	~
French	France	#	$	à	°	ç	§	^	`	é	ù	è	¨
German	Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
UK	England	£	$	@	[	\	]	^	`	{	|	}	~
Dansh1	Denmark	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Swedsh	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italn	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
Spnsh1	Spain	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
Jpnese	Japan	#	$	@	[	¥	]	^	`	{	|	}	~
Norwgn	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Dansh2	Denmark	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Spnsh2	Spain	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
Portgs	Portugal	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú



8) SETS: IBM1 *Select Characters for Codes 128-255*

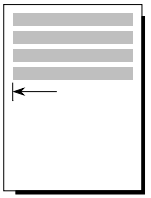
When an Epson or IBM emulation is selected, SETS lets you select a character set for ASCII codes 128 to 255. You can select *IBM1* for IBM set #1; *IBM2* for IBM set #2; *Ital1* for Epson italics set #1; *Ital2* for Epson italics set #2; or *None* for no set (the printer ignores codes above 127).

ASCII Code	*IBM # 1*	*IBM # 2*	*Ital #1*	*Ital #2*	ASCII Code	*IBM # 1*	*IBM # 2*	*Ital #1*	*Ital #2*
128	NUL	Ç	NUL	Ç	155	ESC	¢	ESC	¢
129		ü		ü	156		£		£
130		é		é	157		¥		¥
131		â		â	158		₧		₧
132		ä		ä	159		ƒ		ƒ
133		à		à	160	á	á	*á*	*á*
134		å		å	161	í	í	*!*	*!*
135	BEL	ç	BEL	ç	162	ó	ó	"	"
136	BS	ê	BS	ê	163	ú	ú	#	#
137	HT	ë	HT	ë	164	ñ	ñ	*$*	*$*
138	LF	è	LF	è	165	Ñ	Ñ	%	%
139	VT	ï	VT	ï	166	ª	ª	&	&
140	FF	î	FF	î	167	º	º	'	'
141	CR	ì	CR	ì	168	¿	¿	*(*	*(*
142	SO	Ä	SO	Ä	169	⌐	⌐	)	)
143	SI	Å	SI	Å	170	¬	¬	*	*
144		É		É	171	½	½	+	+
145	DC1	æ	DC1	æ	172	¼	¼	'	'
146	DC2	Æ	DC2	Æ	173	¡	¡	-	-
147	DC3	ô	DC3	ô	174	«	«	.	.
148	DC4	ö	DC4	ö	175	»	»	/	/
149		ò		ò	176	▒	▒	*0*	*0*
150		û		û	177	▒	▒	*1*	*1*
151		ù		ù	178	▓	▓	*2*	*2*
152	CAN	ÿ	CAN	ÿ	179	│	│	*3*	*3*
153		ö		ö	180	┤	┤	*4*	*4*
154	SUB	Ü	SUB	Ü	181	╡	╡	*5*	*5*

Character Sets—continued

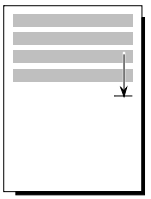
ASCII Code	*IBM # 1*	*IBM # 2*	*Ital #1*	*Ital #2*	ASCII Code	*IBM # 1*	*IBM # 2*	*Ital #1*	*Ital #2*
182	╣	╣	*6*	*6*	219			*[*	*[*
183	╗	╗	*7*	*7*	220			**	**
184	╕	╕	*8*	*8*	221			*]*	*]*
185	╝	╝	*9*	*9*	222			*^*	*^*
186	╜	╜	*:*	*:*	223				
187	╛	╛	*;*	*;*	224	α	α	*_*	*_*
188	╙	╙	*<*	*<*	225	ß	ß	*a*	*a*
189	╘	╘	*=*	*=*	226	Γ	Γ	*b*	*b*
190	╒	╒	*>*	*>*	227	π	π	*c*	*c*
191	┐	┐	*?*	*?*	228	∑	∑	*d*	*d*
192	└	└	*@*	*@*	229	σ	σ	*e*	*e*
193	┴	┴	*A*	*A*	230	µ	µ	*f*	*f*
194	┬	┬	B	B	231	τ	τ	*g*	*g*
195	├	├	*C*	*C*	232	Φ	Φ	*h*	*h*
196	─	─	*D*	*D*	233	Θ	Θ	*i*	*i*
197	┼	┼	*E*	*E*	234	Ω	Ω	*j*	*j*
198	╞	╞	*F*	*F*	235	δ	δ	*k*	*k*
199	╟	╟	*G*	*G*	236	∞	∞	*l*	*l*
200	╚	╚	*H*	*H*	237	ø	ø	*m*	*m*
201	╔	╔	*I*	*I*	238	ε	ε	*n*	*n*
202	╩	╩	*J*	*J*	239	∩	∩	*o*	*o*
203	╦	╦	*K*	*K*	240	≡	≡	*p*	*p*
204	╠	╠	*L*	*L*	241	±	±	*q*	*q*
205	═	═	*M*	*M*	242	≥	≥	*r*	*r*
206	╬	╬	*N*	*N*	243	≤	≤	*s*	*s*
207	╧	╧	*O*	*O*	244	⌠	⌠	*t*	*t*
208	╨	╨	*P*	*P*	245	⌡	⌡	*u*	*u*
209	╤	╤	*Q*	*Q*	246	÷	÷	*v*	*v*
210	╥	╥	*R*	*R*	247	≈	≈	*w*	*w*
211	╙	╙	*S*	*S*	248	°	°	*x*	*x*
212	╘	╘	*T*	*T*	249	∙	∙	*y*	*y*
213	╒	╒	*U*	*U*	250	·	·	*z*	*z*
214	╓	╓	*V*	*V*	251	√	√	*{*	*{*
215	╫	╫	*W*	*W*	252	ⁿ	ⁿ	*|*	*|*
216	╪	╪	*X*	*X*	253	²	²	*}*	*}*
217	┘	┘	*Y*	*Y*	254	■	■	*~*	*~*
218	┌	┌	*Z*	*Z*	255				

9) AUTO CR:Off — *Turn Automatic Carriage Return Mode On and Off*



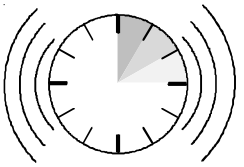
AUTO CR lets you turn the automatic carriage return mode on and off. In the automatic carriage return mode, the printer performs a carriage return/line feed for each line feed code it receives. You can select *On* to turn the automatic carriage return mode on; or *Off* to turn the mode off.

10) AUTO LF:Off — *Turn Automatic Line Feed Mode On and Off*



AUTO LF lets you turn the automatic line feed mode on and off. In the automatic line feed mode, the printer performs a carriage return/line feed for each carriage return code it receives. You can select *On* to turn the automatic line feed mode on; or *Off* to turn the mode off.

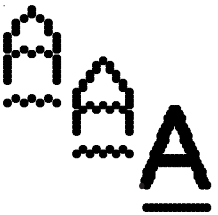
11) ERRBEL:Once — *Select Audible Alarm Mode*



ERRBEL lets you select how often the printer sounds the audible alarm (three quick beeps) when an error occurs. You can select *Once,* so the alarm sounds only once; *Cont,* so the alarm sounds every 15 seconds; or *Dcay,* so the alarm sounds at increasingly longer intervals until it sounds only once every hour.

Using Text Appearance Parameters

The next section on the Setup menu is text appearance. The text appearance parameters let you change the way text prints on the page.



12) QUAL: Letter *Set Print Quality*

QUAL lets you specify a quality for printing text. You can select *Letter* for letter-quality text; *Memo* for memo-quality text; or *Draft* for draft-quality text. The quality that you select affects the print speed. Letter-quality produces the best quality text, but prints the slowest. Conversely, draft-quality prints the fastest, but produces lower quality text.

13) FNT: Courier *Set Font*

Courier
Gothic
Times Roman
Elite

FNT lets you select a font (type style). The fonts you can choose from depend on those in the installed Intelli-card. On standard printers you can select from the following fonts: *Courier, Gothic, TmsRomn* and *Elite.* When you select a font, the PITCH and CELL settings change to the defaults for the selected font. These defaults ensure that the font is spaced correctly when printed.

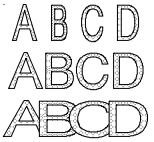
14) PITCH: 10 *Set Pitch*

ABCD
ABCD
A B C D

PITCH lets you specify how many characters to print per inch. You can select *10, 12, 13.3, 15, 17.1, 20* or *PS* (proportional spacing). The *PS* setting only applies if the current font is a PS font. If you select *PS* and the current font is a fixed-pitch font, the printer uses the default pitch of the font. If the current setting is *Other*, then your software application has set the pitch to some nonstandard value.

When you select a pitch, the CELL setting also changes to your pitch selection to ensure that the font expands or compresses to fit the pitch.

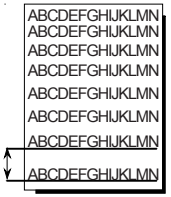
15) CELL: 10 *Set Character Cell Size*



CELL lets you specify how much to expand or compress characters so that they look good when printed at the selected pitch. You can select the same settings as for PITCH; that is, *10, 12, 13.3, 15, 17.1, 20* or *PS* (proportional spacing). To select a setting, consider the following:

- ✓ Using the *same* setting for CELL and PITCH yields the best results.
- ✓ Using a *lower* setting for CELL than for PITCH can result in characters that overlap.
- ✓ Using a *higher* setting for CELL than for PITCH can result in wide gaps between characters.

16) LPI: 10 *Set Number of Lines Per Inch*



LPI lets you specify how many lines to print per inch. You can select *2, 3, 4, 5, 6, 8, 9, 10* or *12* lines per inch. If the current setting is *Other*, then your software application has set the number of lines per inch to some nonstandard value.

17) COLOR: Black *Set Color*

COLOR lets you specify a color for printing. You can select *Black, Cyan* (light blue), *Mgnta* (magenta), *Yellw* (yellow), *Violt* (violet), *Green* or *Orang* (orange). If a monochrome ribbon is installed, the printer ignores your color selection.

18) ITALICS: Off *Turn Italic Mode On and Off*

ITALICS lets you turn the italic mode on and off. In the italic mode, characters slant to the right by about 20%. You can select *On* or *Off*.

19) HIGH: Off *Turn Double-High Mode On and Off*

HIGH lets you turn the double-high mode on and off. In double-high mode, characters stretch to twice their normal height (downward in the AMT and Diablo 630 emulations; upward in the IBM and Epson emulations). You can select *On* or *Off*. When you turn on the double-high mode, the LPI setting changes to three lines per inch. When you turn off the mode, the LPI setting changes to six lines per inch.

20) WIDE: Off *Turn Double-Wide Mode On and Off*

WIDE lets you turn the double-wide on and off. In double-wide mode, characters stretch rightward to twice their normal width. You can select *On* or *Off*. When you turn on the double-wide mode, the PITCH and CELL settings change to one-half their current values. When you turn off the mode, these settings return to their original values.

21) SCRIPT: Off *Turn Super/Subscript Modes On and Off*

SCRIPT lets you turn on and off the superscript and subscript modes. In superscript mode, characters shrink to about half the normal size and print above the normal print line. In subscript mode, the same small characters print below the normal print line. You can select *Supr* to turn the superscript mode on; *Sub* to turn the subscript mode on; or *Off* to turn both modes off.

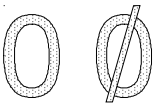
22) UNDLINE: Off *Turn Underline Mode On and Off*

UNDLINE lets you turn the underline mode on and off. In underline mode, all characters and spaces are underlined. You can select *On* or *Off*.

23) BLD/SHA:Off *Turn Bold/Shadow Modes On and Off*

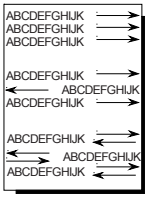
BLD/SHA lets you turn on and off the bold and shadow modes. In bold mode, characters are printed twice—one on top of the other—to produce bold print. In shadow mode, characters are also printed twice—once and then again slightly offset to the right—to produce shadow print. You can select *Bld* to turn the bold mode on; *Sha* to turn the shadow mode on; or *Off* to turn both modes off.

24) SLASH-0:Off *Turn Zero Slashing On and Off*



SLASH-0 lets you turn zero slashing on and off. You can select *Off* to specify that the numeral zero be printed without a slash (0); or *On* to specify that the numeral zero be printed with a slash (Ø). Your selection affects the printing of the numeral zero in all fonts and print qualities.

25) BI-DIR:Text *Set Printing Direction*



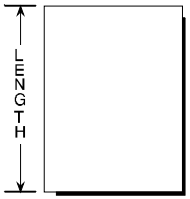
BI-DIR lets you select how the printer prints single-pass text, multi-pass text, and graphics with respect to printing direction. Printing unidirectionally provides the highest possible vertical registration, but slows down printing. You can select the following settings:

Setting	*Single-Pass Text*	*Multi-Pass Text*	*Graphics*
Off	Left-to-right only	Left-to-right only	Left-to-right only
Text	Bidirectional	Unidirectional passes	Left-to-right only
Graf	Bidirectional	Unidirectional passes	Unidirectional passes
Full	Bidirectional	Bidirectional	Bidirectional

Using Page Setup Parameters

The next section of the Setup menu is page setup. Page setup parameters let you specify forms length and margins.

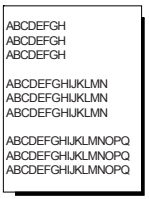
26) LENG: 66/6" *Set Form Length*



LENG lets you specify the length of the form you are using in 1/6-inch increments. This setting is very important since it controls continuous-forms feeding.

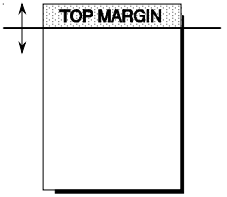
You can select a number from *0* to *182*. To determine the correct number to use for your form, multiply the length of the form in inches by 6. For example, if your form is 11 inches long (11 inches × 6 = 66), you should select *66*. When you set form length, the printer sets the top-of-form at the current line and clears the top and bottom margins.

27) WIDTH:13.6" *Set Maximum Print Width*



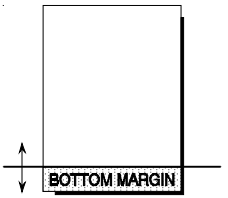
WIDTH lets you specify the maximum print width. If the printer receives a line that exceeds the maximum print width, the excess prints on the next line. On *narrow*-carriage printers, you can specify *8″*, *8.5″*, or *11*". On *wide*-carriage printers, you can specify *8″*, *13.6″* or *16*". If you set the maximum print width to *11″* or *16″*, be sure to load the paper so that it aligns with the blue line at the far left on the paper scale. Also, *11″*- and *16″*-wide printing is unidirectional and slower than normal.

28) TOP MAR: 0 *Set Top Margin*



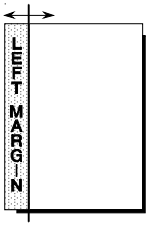
TOP MAR lets you specify a top margin. On subsequent form feeds, paper advances to the top margin you specify. The top margin can be from *0* to *363* lines down from the top-of-form; however, you can only select a line that is above the bottom margin setting. The physical location of the top margin on the page is unaffected by subsequent changes to line spacing. If you change the LENG (form length) setting, the top margin resets to *0*.

29) BOT MAR: 66 *Set Bottom Margin*



BOT MAR lets you specify a bottom margin. After printing on this line, the printer performs a form feed operation automatically; no printing occurs below the bottom margin. The bottom margin can be from *1* to *364* lines down from the top-of-form; however, you can only select a line that is below the top margin setting. The physical location of the bottom margin on the page is unaffected by subsequent changes to line spacing. If you change the LENG (form length) setting, the bottom margin resets to the new form length.

30) LFT MAR: 0 *Set Left Margin*

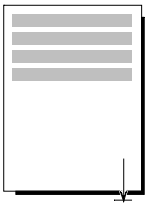


LFT MAR lets you specify a left margin. All subsequent carriage returns cause the carriage to move to the left margin. You specify the left margin as a number of character spaces to the right of the far left print position; however, you can only select a character space that is to the left of the right margin setting. To compute the correct LFT MAR setting, just multiply the left margin you want in inches by the PITCH setting. For example, if you want a 1/2-inch left margin and the PITCH is set to 10, you would set this parameter to 5 (1/2 x 10 = 5). To help you visualize left margin locations as you scroll through the possible settings, the carriage moves to the displayed setting. The physical location of the left margin on the page is unaffected by subsequent changes to horizontal spacing (character pitch).

31) RGT MAR: 136 *Set Right Margin*

RGT MAR lets you specify a right margin. When printing reaches the right margin on a line, the printer performs a carriage return/line feed and continues printing on the next line. You specify the right margin as a number of character spaces to the right of the far left print position; however, you can only select a character space that is to the right of the left margin setting. To help you visualize right margin locations as you scroll through the possible settings, the carriage moves to the displayed setting. The physical position of the right margin on the page is unaffected by subsequent changes to horizontal spacing (character pitch).

32) AUTO FF: Off *Turn Automatic Form Feed Mode On and Off*



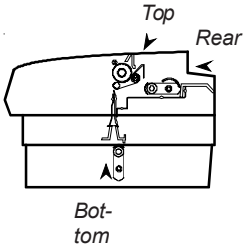
AUTO FF lets you turn the automatic form feed mode on and off. In the automatic form feed mode, the printer skips over the perforations of pin-feed paper by setting the top and bottom margins to one-half inch. You can select *On* to turn the automatic form feed mode on; or *Off* to turn the mode off. For the automatic form feed mode to work correctly, the LENG (form length) parameter must be set to the correct form length.

Using Paper Handling Parameters

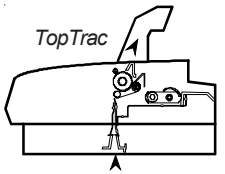
The next section of the Setup menu is paper handling. Paper handling parameters control how paper feeds through the printer.

33) PATH: Top — Select Paper Path

PATH lets you select the active paper path. You can select from the following:

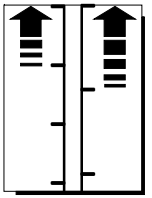


- ✓ *Top.* Loads single sheets from the top of the printer.
- ✓ *Rear.* Loads pin-feed forms from the rear of the printer.
- ✓ *Bottom.* Loads pin-feed forms from the powered, bottom-feed tractor (if your printer has one).



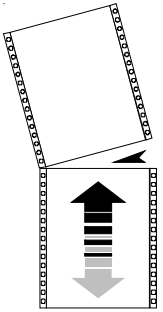
- ✓ *TopTrac.* Activates a top-mounted, pull-tractor option to feed paper from the bottom of the printer. Only select *TopTrac* when the printer is idle and out of paper. The printer will automatically switch to the rear paper path and move the printhead back away from the platen. You can then load paper from the bottom of the printer and into the top-mounted pull-tractor. With *TopTrac* selected, all printer functions that perform reverse paper feeding are disabled, including paper park and the demand document mode.

34) LFSLEW: 6ips — Set Line Feed Speed



LFSLEW lets you change the rate at which paper feeds (slews) through the printer. You can select from *1ips* to *10ips* (inches per second). Slower line feed speeds are recommended for thick paper or multipart forms.

35) DEMAND: Off — *Turn Demand Document Mode On and Off*



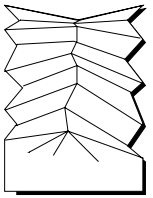
DEMAND lets you turn the demand document mode on and off. The demand document mode lets you remove a pin-fed form without wasting the next form. With the mode on, pressing the Ready button turns printing off, displays DEMND on the control panel, and advances the last printed page up to the tear bar. You can then tear off the page if you want to. Pressing the Ready button again causes one of the following actions:

- ✓ If you *removed* the last printed page, the paper reverse feeds to the next top-of-form, the READY message reappears, and printing continues.
- ✓ If you *did not remove* the last printed page, the paper reverse feeds to its original position, the READY message reappears, and printing resumes at the point where it left off.

You can select from the following settings:

- ✓ *On.* Turns the demand document mode on.
- ✓ *Beep.* Turns the demand document mode on and causes the printer to begin *beeping* 15 seconds after you press the Ready button as a reminder to re-enable printing.
- ✓ *Tear.* Turns the demand document mode on and causes the printer to reverse feed the paper to the next top-of-form when you re-enable printing, regardless of whether you tear off the last printed sheet. This option is useful when printing thick multipart forms that jam when the leading edge of the form is reverse fed below the printhead.
- ✓ *Auto.* Causes the printer to advance the bottom of the last printed page to the tear bar whenever the printer is idle. You don't have to press the Ready button. As soon as the printer receives subsequent data to print, the paper reverse feeds as usual.
- ✓ *Off.* Turns the demand document mode off.

36) PPR JAM: On *Turn Paper Jam Sensing On and Off*



PPR JAM lets you turn the printer's paper jam sensing function on and off. With paper jam sensing on, the printer can detect when a pin-fed form gets jammed inside the printer and will notify you by displaying CLEAR PAPER JAM on the control panel display. With paper jam sensing off, the printer cannot detect paper jams. During ordinary operation, you should leave paper jam sensing on. Certain paper stocks, such as high-gloss, exceptionally smooth paper, can cause the printer to falsely detect paper jams. In these rare cases, you can turn paper jam sensing off. You can select *On* to turn paper jam sensing on; or *Off* to turn it off.

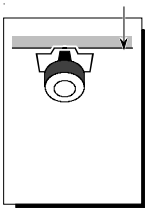
37) PGE END:Off *Select Page End Method*

PGE END lets you tell the printer whether or not to use the LENG (form length) setting to determine the last printing line on a cut sheet. You can select *Off* to let printing continue beyond the LENG setting; or *On* to specify that printing stop at the LENG setting. A third setting is *Roll*, which you can select to feed unsprocketed roll paper into the printer. When you select *Roll*, printing is continuous without regard for page length.

☞**Note:** Most software applications control pagination by sending a form feed control code at the end of each page. In these cases, the PGE END setting should be *Off*. A few software applications do not control pagination directly, but instead send out only line feed control codes between consecutive pages. In these cases, the PGE END setting should be *On*. Regardless of the PGE END setting, the last print line on a cut sheet occurs when the printer receives a form feed control code.

38) POPUP: Off

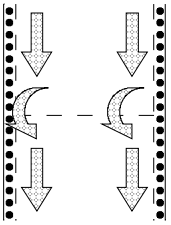
Turn Preprinted Forms Alignment Mode On and Off



POPUP lets you turn the preprinted forms alignment mode on and off. When the mode is on, you can easily align a preprinted form so that printing begins on any desired line. Just press the Ready button to pause printing and use the Select-dial to align the first print line on the form with the top edge of the ribbon shield. After you press the Ready button again, printing will begin on the desired print line. You can select *On* to turn the preprinted forms alignment mode on; or *Off* to turn it off.

39) AUTOBAIL:Off

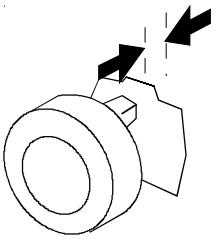
Turn Automatic Bail Mode On and Off



AUTOBAIL lets you turn the automatic bail mode on and off. With the automatic bail mode on, the printer will open the bail each time the perforation of a pin-feed form passes by. After the perforation is clear of the bail, the printer will close the bail. This mode is useful when using thick, multipart forms with perforations that tend to catch on the bail. You can select *On* to turn the automatic bail mode on; or *Off* to turn it off.

For the automatic bail mode to work correctly, you must turn the mode on before loading pin-feed paper into the printer and the LENG (form length) parameter must be set to the correct form length.

40) PH GAP: Auto *Set Print Density*

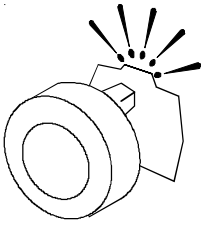


PH GAP lets you enable and disable automatic forms thickness detection. When set to *Auto*, the printer automatically detects forms thickness and adjusts the print gap (that is, the physical distance between the printhead and the form) for optimal print density.

If necessary, you can disable this function and manually select a fixed print gap. This causes the printer to move the printhead a fixed distance away from the platen, regardless of the actual forms thickness. To set the print gap manually, set this parameter to a value from *10* to *45*. A setting of *10* moves the printhead as close to the platen as possible and results in the darkest printing. Conversely, a setting of *45* moves the printhead as far from the platen as possible and results in the lightest printing.

Caution: Use care when disabling automatic forms thickness detection. If a manual setting is too high, printing may be too light or disappear altogether. If a manual setting is too low, the ribbon can snag on the printhead causing damage to both the ribbon and printhead.

41) PFORCE: Auto *Set Print Force*



PFORCE lets you enable and disable automatic print force control. When set to *Auto*, the printer automatically adjusts the print force so that it is optimal for the form being printed.

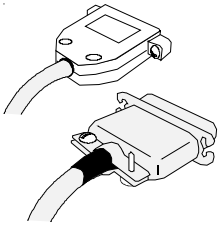
If necessary, you can disable this function and manually select a fixed print force. This causes the printer to use the selected print force when printing all forms, regardless of the actual forms thickness. To set the print force manually, set this parameter to a value from *1* to *10*. A setting of *1* weakens the print force and results in lighter printing. Conversely, a setting of *10* strengthens the print force and results in darker printing.

Caution: Printing with too much print force reduces the life of the printhead and also increases printing noise.

Setting Communications Parameters

The next section of the Setup menu is communications. These parameters control data communications between the printer and the host computer.

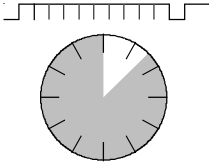
42) INTRFCE: Auto *Select Interface*



INTRFCE lets you select the parallel or serial interface port for communications with the host computer. You can select *Par* for parallel, *Ser* for serial, or *Auto* for automatic switching between both ports on a first-come, first-serve basis (while receiving data from one port, the printer will set the other port to the busy state). When you change this parameter, the printer clears the data input buffer.

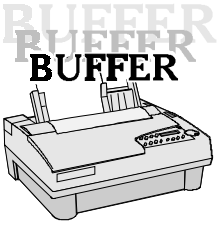
☞**Note:** To use the serial interface, you must set the BAUD, HNDSHK, DATA BITS, STOP BITS, and PARITY parameters to match the serial configuration of the host computer. When using the parallel interface, these parameter settings are irrelevant.

43) BAUD: 9600 *Specify Baud Rate*



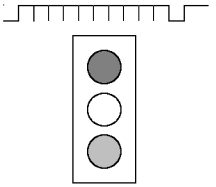
BAUD lets you tell the printer what serial baud rate your computer is using. Baud rate is the speed that serial data is transmitted between your computer and the printer. You can can select *75, 150, 300, 600, 1200, 2400, 4800, 9600* or *19200*. Both your computer and the printer must be set to the *same* baud rate.

44) BUFFER: 48K *Specify Input Buffer Size*



BUFFER lets you change the size of the printer's data input buffer to meet the specific requirements of your computer system. For example, some older computer systems require a small printer buffer which maximizes handshaking and prevents timeout errors from occurring. You can specify *512* bytes, *1K, 2K, 4K, 8K, 16K, 32K, 48K, 64K, 80K*, or up to the total printer memory. When you change this parameter, the printer clears the data input buffer.

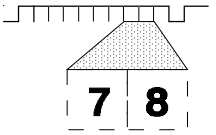
45) HNDSHK: D/X *Specify Handshaking Method*



HNDSHK lets you tell the printer what handshaking method your computer is using. Handshaking is a technique that starts and stops data transmission between your computer and the printer. This starting and stopping is important so that neither device receives more data than it can handle at any given time. Without handshaking, the printer's input buffer could overflow.

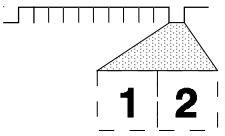
The printer supports three handshake protocols: DTR, X-ON/X-OFF and ENQ/ACK. DTR is a hardware handshake that uses the Data Terminal Ready line in the serial interface. Both X-ON/X-OFF and ENQ/ACK are software handshakes that require the computer or printer to send certain data bytes on its data transmission line. You can specify *DTR* for the DTR hardware method; *XON* for the X-ON/X-OFF software method; *ENQ* for the ENQ/ACK software method; *D/X* for both the DTR and X-ON/X-OFF methods; *D/E* for both the DTR and ENQ/ACK methods; or *None* for no handshaking method. Both your computer and the printer must use the *same* handshaking method(s).

46) DATA BITS: 8 *Specify Number of Data Bits*



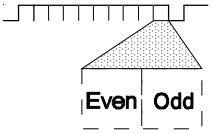
DATA BITS lets you tell the printer how many data bits your computer is sending in each byte. You must select *7* if your computer sends 7-bit bytes; or *8* if your computer sends 8-bit bytes.

47) STOP BITS: 1 *Specify Number of Stop Bits*



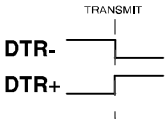
STOP BITS lets you tell the printer how many stop bits your computer is sending in each byte. Stop bits are necessary to separate consecutive bytes in the data stream. You must select *1* if your computer sends one stop bit; or *2* if your computer sends two stop bits.

48) PARITY: None — *Specify Parity*



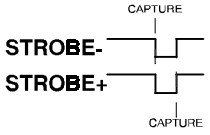
PARITY lets you tell the printer what parity method your computer is using. When your computer uses parity, it adds a special parity bit to each data byte it sends. This parity bit enables the printer to detect a data transmission error. In the even parity method, the sum of the binary 1 bits plus the parity bit must be an even number, or else an error has occurred. In the odd parity method, the sum of the binary 1 bits plus the parity bit must be an odd number, or else an error has occurred. You must select *None* if your computer does not support parity; *Odd* if your computer uses odd parity; or *Even* if your computer uses even parity. Both your computer and the printer must be set for the *same* parity method.

49) DTR: Pos — *Set DTR Signal Polarity*



DTR lets you specify the polarity of the extra Data Terminal Ready (DTR) signal in the printer's serial interface. The signal is supplied on pin 25 or pin 11, depending on how the printer is configured. Since most computers use the standard DTR signal on pin 20 for handshaking, this parameter set-ting is usually ignored. You can select *Neg* for a signal that goes low to enable data transmission; or *Pos* for a signal that goes high to enable data transmission.

50) STROBE: Neg — *Specify STROBE Pulse Edge for Data Capture*



STROBE lets you specify on which edge of the parallel STROBE pulse the printer will capture the data byte. You can select *Neg* to capture data on the leading, negative edge of the STROBE pulse; or *Pos* to capture data on the trailing, positive edge of the STROBE pulse. In most cases, the *Neg* setting will provide reliable data transfer. If your computer's parallel interface sends the STROBE pulse before data has fully settled on the data lines (resulting in data loss), you may be able to correct the problem by selecting the *Pos* setting.

Reviewing the Setup Menu

Now that you've been introduced to the Setup menu parameters and their possible settings, it's time for a brief review.

Table 4-1. Setup Menu Summary

Parameter	*Description*	*Settings*
	Operations	
RSTOR	Restore printer settings	*None* Usr 1 Usr 2 Usr 3 Usr 4 Usr 5 Fctry
SAVE	Save printer settings	*None* Usr 1 Usr 2 Usr 3 Usr 4 Usr 5
DFALT	Select power-on default settings	*Fctry* Usr 1 Usr 2 Usr 3 Usr 4 Usr 5
TEST	Run printer tests	*None* Memory Sensor Ribbon Pcalib Random Gap
	Printer Setup	
EMUL	Set printer emulation	*AMT* Diab630 EpsonJX EpsonLQ IBMXL24 BarCode HexMode
QUIET	Turn quiet mode on and off	*Off* On
LANG	Set language	*USA* French German UK Dansh1 Swedsh Italn Spnsh1 Jpnese Norwgn Dansh2 Spnsh2 Portgs

Table 4-1. Setup Menu Summary—continued

Parameter	*Description*	*Settings*
Printer Setup—continued		
SETS	Select characters for codes 128 through 255	*IBM1* IBM2 Ital1 Ital2 None
AUTO CR	Turn automatic carriage return mode on and off	*Off* On
AUTO LF	Turn automatic line feed mode on and off	*Off* On
ERRBEL	Select audible alarm mode	*Once* Dcay Cont
Text Appearance		
QUAL	Set print quality	*Letter* Memo Draft
FONT	Set font	*Courier* Gothic TmsRomn Elite
PITCH	Set pitch	*10* 12 13.3 15 17.1 20 PS
CELL	Set character cell size	*10* 12 13.3 15 17.1 20 PS
LPI	Set number of lines per inch	2 3 4 5 *6* 8 9 10 12
COLOR	Set color	*Black* Cyan Mgnta Yellw Violt Green Orang
ITALICS	Turn italic mode on and off	*Off* On
HIGH	Turn double-high mode on and off	*Off* On

Table 4-1. Setup Menu Summary—continued

Parameter	*Description*	*Settings*
Text Appearance—continued		
WIDE	Turn double-wide mode on and off	*Off* On
SCRIPT	Turn super/subscript modes on and off	*Off* Supr Sub
UNDLINE	Turn underline mode on and off	*Off* On
BLD/SHA	Turn bold/shadow modes on and off	*Off* Bld Sha
SLASH-0	Turn zero slashing on and off	*Off* On
BI-DIR	Set printing direction	*Text* Graf Full Off
Page Setup		
LENG	Set form length	0/6" to 182/6" (*66/6"*)
WIDTH	Set maximum print width	8" *8.5"* 11" *(narrow models)* 8" *13.6"* 16" *(wide models)*
TOP MAR	Set top margin	*0* to 363
BOT MAR	Set bottom margin	1 to 364 (*66*)
LFT MAR	Set left margin	*0* to 319
RGT MAR	Set right margin	1 to 320 (*85*) *(narrow models)* 1 to 320 (*136*) *(wide models)*
AUTO FF	Turn automatic form feed mode on and off	*Off* On

Table 4-1. Setup Menu Summary—continued

Parameter	*Description*	*Settings*
	Paper Handling	
PATH	Select paper path	*Top* Rear Bottom TopTrac
LFSLEW	Set line feed speed	1ips to 10ips (*6ips*)
DEMAND	Turn demand document mode on and off	*Off* On Beep Tear Auto
PPR JAM	Turn paper jam sensing on and off	*On* Off
PGE END	Select page end method	*Off* On Roll
POPUP	Turn preprinted forms alignment mode on and off	*Off* On
AUTO-BAIL	Turn automatic bail mode on and off	*Off* On
PH GAP	Set print density	*Auto* 10 to 45
PFORCE	Set print force	*Auto* 1 to 10

Table 4-1. Setup Menu Summary—continued

Parameter	*Description*	*Settings*
	Communications	
INTRFCE	Select interface	*Auto* Par Ser
BAUD	Specify baud rate	75 150 300 600 1200 2400 4800 *9600* 19200
BUFFER	Specify input buffer size	512 1K 2K 3K 4K 8K 16K 32K *48K* 64K 80K or more depending on installed memory
HNDSHK	Specify handshaking method	*D/X* ENQ D/E XON DTR None
DATA BITS	Specify number of data bits	7 *8*
STOP BITS	Specify number of stop bits	*1* 2
PARITY	Specify parity	*None* Odd Even
DTR	Set DTR signal polarity	*Pos* Neg
STROBE	Specify STROBE pulse edge for data capture	Pos *Neg*

Section

5

Cleaning and Maintenance

To maintain trouble-free operation and good print quality, you should perform periodic cleaning and preventive maintenance procedures on your printer. This section provides the following procedures:

- ✓ Removing and installing the top cover
- ✓ Cleaning the platen and bail rollers
- ✓ Cleaning the main carriage shaft
- ✓ Cleaning the printhead wires
- ✓ Cleaning printer surfaces
- ✓ Replacing the ribbon cartridge
- ✓ Replacing the fuse
- ✓ Inspecting printer parts
- ✓ Replacing the printhead

Removing and Installing the Top Cover

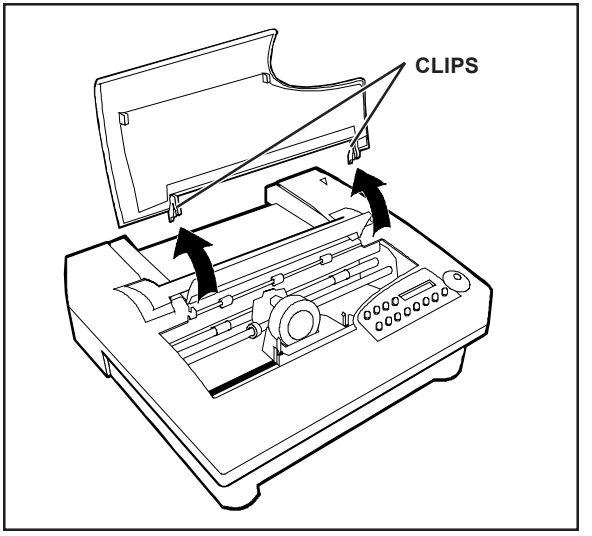


Figure 5-1. Removing the Top Cover

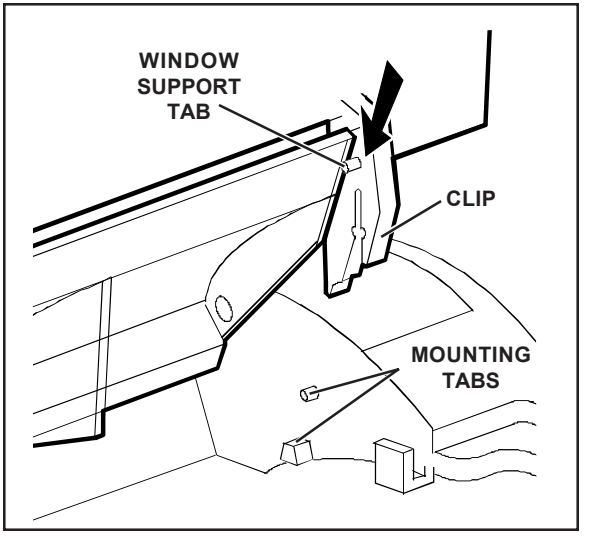


Figure 5-2. Aligning the Platen Window and Top Cover

Maintenance and troubleshooting procedures require you to remove the top cover to access internal printer components.

To remove the top cover, simply lift up the front edge, as shown in figure 5-1.

To re-install the top cover, perform the following procedure:

1. Position the platen window between the back edge of the top cover and the window support tabs, as shown in figure 5-2.
2. Press down on the top cover until the clips snap onto the mounting tabs.
3. Lower the top cover back into place.

Cleaning the Platen and Bail Rollers

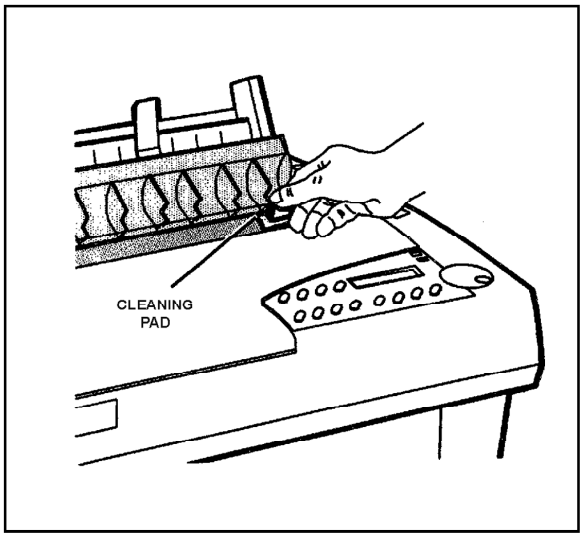


Figure 5-3. Cleaning the Platen and Bail Rolle

You should clean the platen and bail rollers whenever there is ink or paper fibers on the platen, the platen appears shiny, or printed pages contain vertical smears. To do so, you'll need a cleaning pad moistened with Fedron® platen cleaner (available at most typewriter supply stores). Fedron includes preservatives and lubricants that greatly increase the life of the platen. Always use Fedron sparingly and do not apply it to any surface other than the platen and bail rollers. Fedron is extremely flammable, so be sure to read and follow all precautions on the container.

To clean the platen and bail rollers, use the following procedure:

1. Remove the top cover. Then, re-install the top cover with the platen window in the raised postion.
2. Press the Ready button to pause the printer.
3. Using a clean pad moistened with Fedron, wipe the rubber surfaces of the platen and bail rollers until they are dull and clean, as shown in figure 5-3. Use the Select-dial to turn the platen and the Bail button to move the bail.
4. Remove and re-install the the top cover with the platen window in the normal position. Then, run a printer self test to verify normal operation.

Cleaning the Main Carriage Shaft

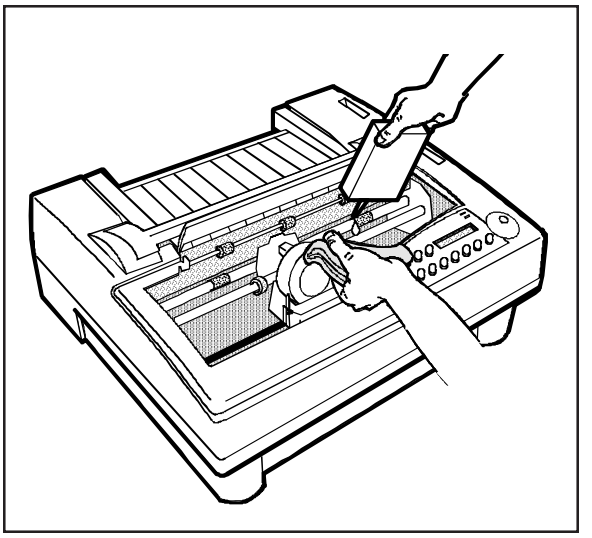


Figure 5-4. Cleaning the Main Carriage Shaft

The carriage slides on two shafts. The main shaft, located directly under the printhead, requires occasional lubrication. The other shaft near the front of the printer *does not* require lubrication. You must use 3-In-One® machine oil or an equivalent oil. To clean the main carriage shaft, use these steps:

1. With the printer off, remove the top cover. Leave the platen window in the raised position.
2. Slide the carriage to one side and, using a clean, lint-free cloth, wipe the main shaft *away from* the carriage. Slide the carriage to the other side and wipe the main shaft again *away from* the carriage.
3. While holding the cloth below the shaft, apply two or three drops of oil, as shown in figure 5-4. Then, slowly slide the carriage along the shaft and stop at the far side of the chassis.
4. Repeat step 4, only this time slide the carriage back and forth several times to work the oil into the carriage's self-lubricating felt rings.
5. To remove any excess oil, slide the carriage to one side and wipe the main shaft. Slide the carriage to the other side and wipe the main shaft again.
6. Replace the top cover.

Caution: If you accidently lubricate the front support shaft, *do not* use cleaners to remove the oil. Instead, use a lint-free rag to carefully wipe the shaft until it is clean.

Cleaning the Printhead Wires

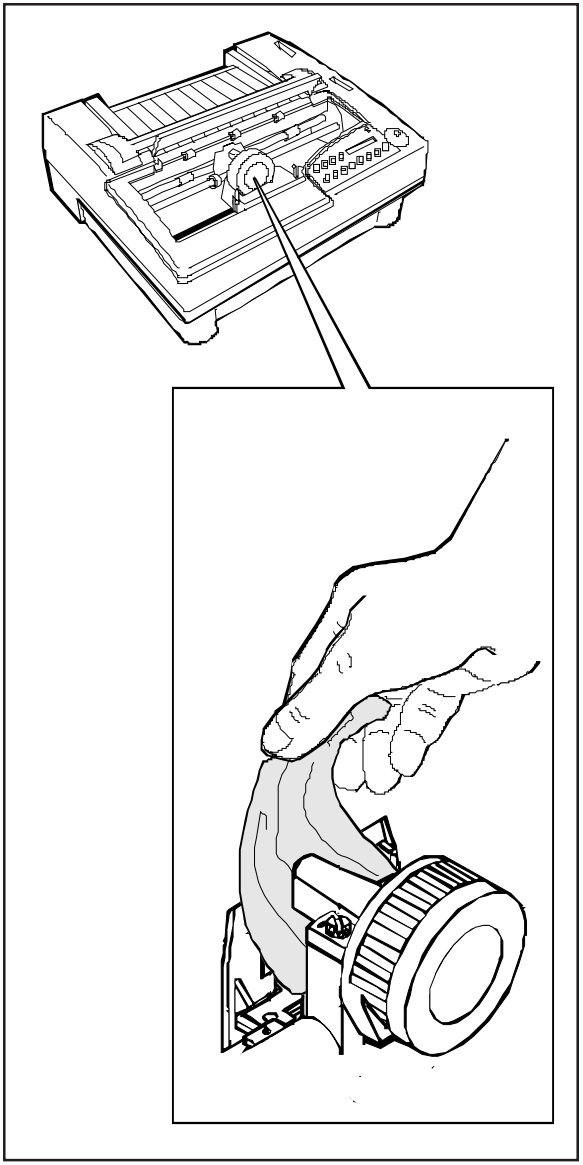


Figure 5-5. Cleaning the Printhead Wires

To prevent excessive ink build-up on the printhead wires, you should periodically wipe them with pure silicone lubricant (LPS-1® or an equivalent).

To clean the printhead wires, use the following procedure:

1. With the printer off, remove the top cover. Leave the platen window in the raised position.
2. If a ribbon cartridge is installed, push outward on the retaining tabs that secure the cartridge to the carriage; then lift up and remove the cartridge.
3. Using a soft tissue moistened with pure silicone lubricant, gently wipe the tip of the printhead to remove any ink build-up, as shown in figure 5-5.
4. Replace the ribbon cartridge.
5. Replace the top cover. Then, run a printer self-test to verify normal operation.

Cleaning Printer Surfaces

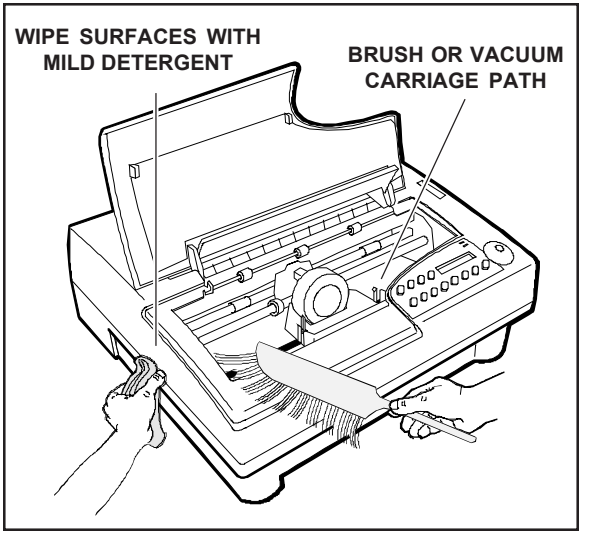


Figure 5-6. Cleaning Printer Surfaces

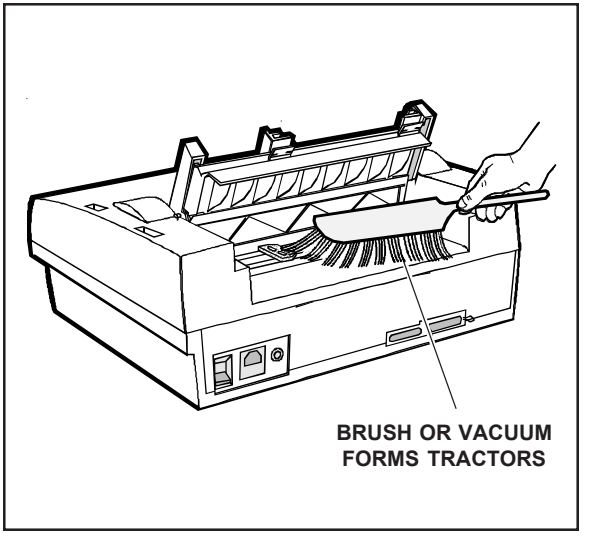


Figure 5-7. Cleaning the Forms Tractors

To keep your printer looking new, you should periodically clean its surfaces with glass cleaner (Windex® or equivalent), 91% isopropyl alcohol, or a mild dishwashing detergent (Lux® or equivalent).

To clean the printer surfaces, use the following procedure:

1. Turn off the printer and detach the power cord.
2. Using a soft brush or lint-free cloth, dust all of the exterior surfaces, as shown in figure 5-6. Be sure the cloth is free of grit or other matter.
3. Using a cloth lightly moistened with glass cleaner, 91% isopropyl alcohol, or a mild dishwashing detergent, wipe and clean the platen window.
4. Raise the top cover. Using a soft brush or vacuum, remove all paper fibers, dust and foreign matter from inside the printer. Then, lower the top cover.
5. Using a soft brush or vacuum, remove all paper fibers, dust, and foreign matter from the rear forms tractors, as shown in figure 5-7.
6. Re-attach the power cord and turn on the printer. Then, run a printer self test to verify normal operation.

Replacing the Ribbon Cartridge

When printing becomes too light, you should replace the ribbon cartridge. Follow the procedures for *Installing the Ribbon Cartridge* in the *Set Up* section of this guide.

Replacing the Fuse

When the printer is plugged into a power outlet that you have verified is supplying the correct voltage, but the printer shows no sign of operation, the main power fuse may have blown. A blown fuse is a strong indication that the power line is supplying unstable voltage and you should try a different one.

To check and replace the fuse, use the following procedure:

1. Turn off the printer and detach the power cord.
2. Slide open the fuse compartment. The innermost fuse in the compartment is the main power fuse. The other fuse is a spare.
3. Check the main power fuse to make sure that it is in good condition. If it is blown, replace it with the spare fuse. Make sure that the rating on the side of the spare fuse matches the required fuse rating shown on the serial number label on the side or rear of the printer.
4. Close the fuse compartment and re-attach the power cable.
5. Run a printer self test to verify normal operation.

☞**Note:** For instructions on locating the fuse, refer to the *Checking the Voltage Select Switch* procedure in the *Set Up* section of this guide.

Inspecting Printer Parts

You should occasionally inspect printer components so you can prevent problems before they occur. If some component appears to be damaged or worn, contact your service representative for a replacement part.

Caution: Before starting your inspection, be sure to turn off the printer.

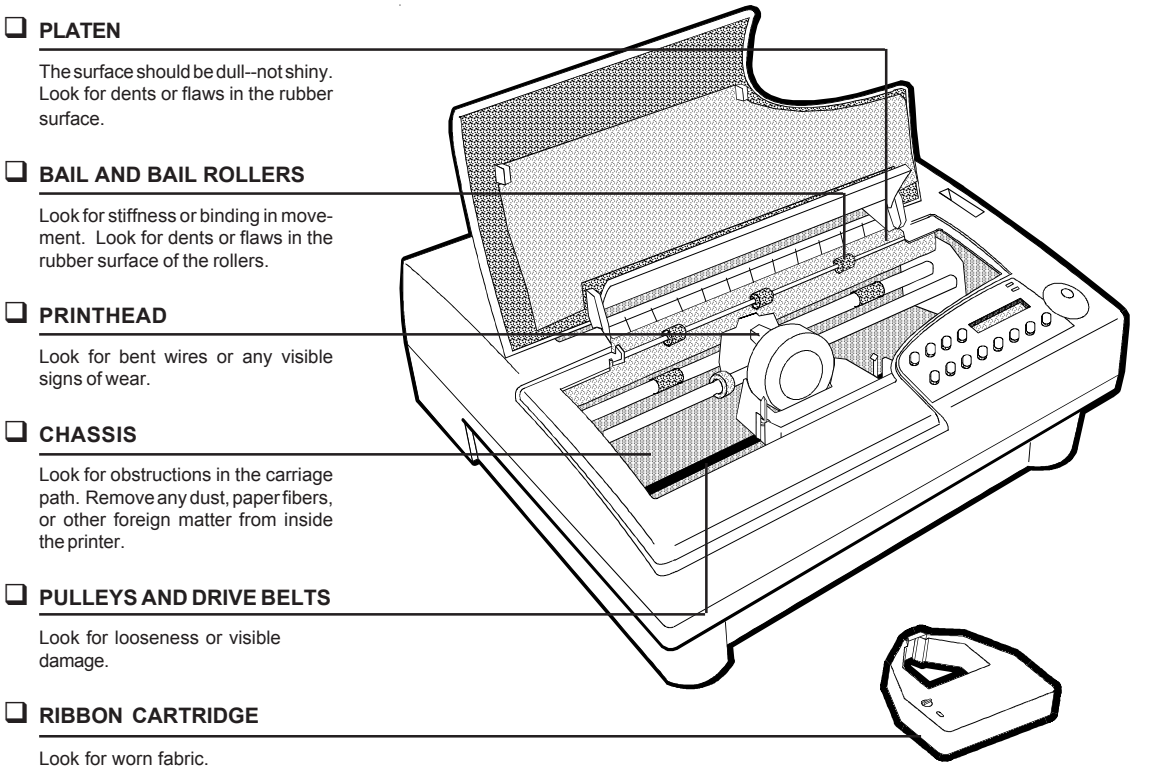


Figure 5-8. Inspecting the Printer, Front

Inspecting Printer Parts—continued

After you complete the inspection checklist on these two pages, turn on the printer and run a self test to verify normal operation.

Caution: Do not inspect the printer with the power turned on.

❑ **INTERFACE CONNECTORS**

Detach the cables. Inspect the cables and connectors for broken wires, frayed or burned insulation, or loose fit.

❑ **FORMS TRACTORS**

Look for obstructions in the paper path. Remove any dust, paper fibers, or other foreign matter from inside the printer. Open and close the tractor locks and doors. Slide the tractors along the shafts. Inspect for binding or stiff movement.

❑ **AC POWER RECEPTACLE**

Detach the cord. Inspect the cord and receptacle for visible signs of wear or damage.

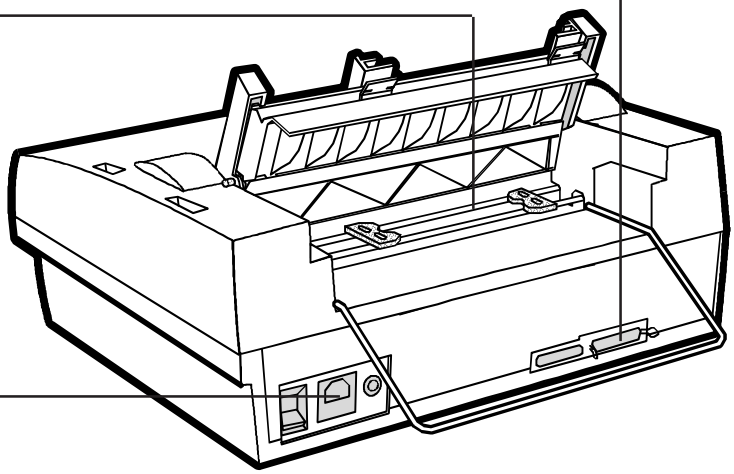


Figure 5-9. Inspecting the Printer, Rear

Replacing the Printhead

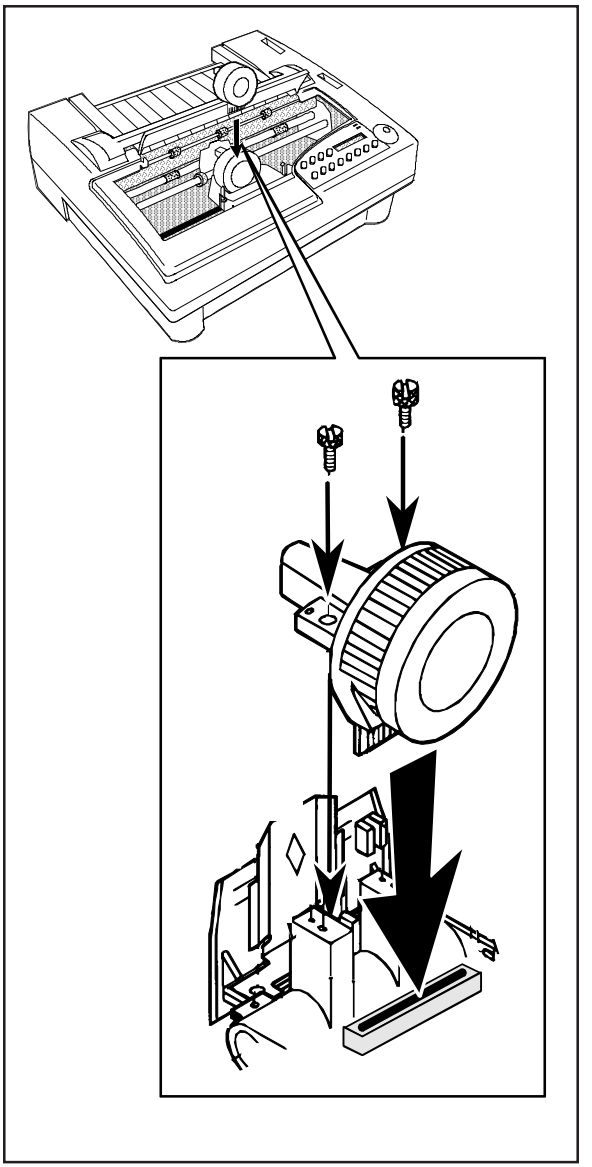


Figure 5-10. Replacing the Printhead

When the printhead wears out, you should replace it with a new one. To do so, use the following procedure:

⚠ **Warning:** The printhead can become very hot while in use. If you have been printing, wait at least five minutes with the printer idle before touching the printhead.

1. Turn off the printer and remove the top cover. Leave the platen window in the raised position.
2. Slide the carriage to the center of the printer.
3. Remove the ribbon cartridge.
4. Using the edge of a coin or a small flat-blade screwdriver, loosen and remove the two screws that secure the printhead to the carriage.
5. Pull the printhead out of the carriage.
6. Align a new printhead over the carriage and plug it into the receptacle, as shown in figure 5-10.
7. Re-install the two screws that secure the printhead to the carriage. When the screws are finger-tight, use a coin or flat-blade screwdriver to tighten them another half turn. *DO NOT* overtighten the screws.
8. Replace the ribbon cartridge and top cover. Then, run a printer self test to verify normal operation.

Section

6

Solving Problems

This section describes printer messages and tells you what corrective action(s) to take. This section also includes a brief troubleshooting guide and information on running printer tests.

Understanding Printer Messages

Printer messages appear on the control panel to warn you of special conditions or notify you of errors. When a special condition or error occurs, several things happen:

- ✓ Printing may pause.
- ✓ The Error light may flash and the Ready light may go off.
- ✓ The printer may *beep* to alert you.
- ✓ A message appears.

When a printer message appears, find it in this section and perform the corrective action(s). There are five kinds of messages: *operating errors*, *programming errors*, *warnings*, *communication errors* and *printer errors*.

Correcting Operating Errors

These errors occur during normal operation to notify you of an action you must perform before printing can continue. After you correct the error, printing resumes where it left off.

CLEAR PAPER JAM

This error message appears when the printer detects a paper jam while printing, ejecting the current page, or parking the paper.

Corrective actions:

- ✓ If the paper is jammed, carefully remove the jammed paper and press the Ready button.
- ✓ If you're using pin-fed forms and the paper does not appear to be jammed, make sure that the paper is taut between the tractors. The printer can falsely detect a paper jam if pin-feed paper is too loose to turn the paper detection wheel. Then, press the Ready button to continue printing.
- ✓ If you're ejecting a very long cut sheet, press the Form Feed button. After the sheet ejects, press the Ready button to continue printing.
- ✓ If you're parking pin-feed paper, tear off the last printed sheet and press the Paper Park button again. After the paper parks, press the Ready button.
- ✓ If this error recurs with no paper in the printer, the paper sensor may be falsely detecting paper. Check to see if there is a small scrap of paper caught in front of the sensor. If not, try cleaning the platen as described in *Cleaning the Platen and Bail Rollers* in the *Cleaning and Maintenance* section of this guide. To clear the error, press the Ready button.

LOAD PAPER

This error message appears when the printer has information to print but detects no paper in the printer:

Corrective action: Load paper and press the Ready button.

☞**Note:** If this error message appears when paper is loaded, clean the surface of the platen as described in *Cleaning the Platen and Bail Rollers* in the *Cleaning and Maintenance* section of this guide. If the error still recurs after you clean the platen, re-calibrate the paper sensor as described in *Re-Calibrating the Paper Sensor* later in this section.

LOWER TOP COVER

This error message appears when one of the following conditions exists:

- ✔ Printing is in progress and you raise the top cover.
- ✔ The printer has information to print but the top cover is raised.

Corrective action: Lower the top cover and press the Ready button.

☞**Note:** If this message displays when the top cover is lowered, refer to *Disabling the Cover Open Interlock* later in this section.

RIBBON ERROR

This error message appears when one of the following conditions exists:

- ✓ You turn on the printer without a ribbon cartridge installed.
- ✓ The ribbon cartridge is not fully seated on the printer carriage.
- ✓ The printer is unable to detect the ribbon cartridge at the home position due to a malfunctioning ribbon home sensor.

When this message appears, printing continues although the colors may be wrong.

Corrective action: If no ribbon cartridge is installed, install a cartridge. If a cartridge is already installed, remove it and then reinstall it; or use another ribbon cartridge. Then, press the Ready button twice to clear the error. If the error recurs, the ribbon home sensor may need to be re-aligned or replaced. Contact your Service Representative.

UNAVAILABLE

This error message appears when you press a control panel button that has been locked to prevent unauthorized changes.

Corrective action: To temporarily unlock all control panel functions, hold down the Alt and Form Feed buttons and press the Setup button twice. To re-lock the control panel functions, press this button combination again. For more information, refer to *Locking Control Panel Functions* later in this section.

UNLOAD PAPER

This error message appears when you attempt to park pin-feed paper while using a top-mounted, pull-tractor option or you attempt to re-calibrate the paper sensor with paper loaded in the printer.

Corrective action: Manually unload the paper and press the Ready button.

Correcting Programming Errors

These messages appear when your computer tries to select a printer feature that is unavailable. When a programming error occurs, a message appears to warn you and printing continues.

BAR CODE UNAVAIL

This error message appears when your computer tries to select a bar code that is not in the installed FLASH memory. When this message displays, the printer *beeps* and printing continues.

Corrective actions: Press the Ready button to pause printing and then the Clear button twice to clear the data input buffer. Perform one of the following actions:

- ✓ If you *do not have* the missing bar code, you must change the print job to request an available bar code. After the change, restart the print job from the beginning.

EMULATION ERROR

This error message appears when your computer tries to select a printer emulation that is not in the installed FLASH memory. When this message dis-plays, the printer *beeps*, the current printer emulation remains active and printing continues. Subsequent printing may contain erroneous characters and coding, due to the missing printer emulation.

EMULATION ERROR—continued

Corrective actions: Press the Ready button to pause printing and then the Clear button twice to clear the data input buffer. Perform one of the following actions:

- ✓ If you *do not have* the correct emulation, you must configure your software to request an available printer emulation. To determine these emulations, print a *Printer Status Report* or just press the Emul button on the control panel. After the configuration change, restart the print job from the beginning.

FONT UNAVAILABLE

This error message appears when your computer tries to select a font that is not in the installed FLASH memory. When this message displays, the printer *beeps* and printing continues.

Corrective actions: Press the Ready button to pause printing and then the Clear button twice to clear the data input buffer. Perform one of the following actions:

- ✓ If you *do not have* the missing font, you must change the print job to request an available font. To determine these fonts, press the Font button on the control panel. After the change, restart the print job from the beginning.

Understanding Warnings

These messages appear to warn you of special printer conditions.

INITIALIZING....

This warning appears each time you turn on or reset the printer to notify you that the printer is preparing for normal operation. When the warning disappears, the printer is ready to print.

Corrective action: None.

MANUAL PHGAP SET

This warning appears when you press the Print Density button to access the print density adjustment scale, but automatic forms thickness detection is disabled.

Corrective action: To enable automatic forms thickness detection, set the PH GAP parameter on the Setup menu to *Auto*. Then, when you press the Print Density button, the print density adjustment scale will appear.

RUN PCALIB TEST

This warning appears when the printer is unable to properly detect paper in the printer.

Corrective action: First, try cleaning the platen as described in *Cleaning the Platen and Bail Rollers* in the *Cleaning and Maintenance* section of this guide. If the warning recurs after you clean the platen, recalibrate the paper sensor as described in *Re-Calibrating the Paper Sensor* later in this section.

Correcting Communication Errors

These messages only appear while the serial interface is in use. When a serial communication error occurs, printing stops and some or all print data is lost. After you perform the corrective action(s), you must restart the print job from the beginning.

BUFFER OVERFLOW

This message appears when the printer's input buffer overflows. A buffer overflow occurs when one of the following conditions exists:

- ✓ The printer and your computer are not using the same handshaking method.
- ✓ The printer and your computer are not using a handshaking method and the baud rate exceeds the print speed.

Corrective action: Press the Ready button to pause printing and then the Clear button *twice* to clear the data input buffer. Change the HNDSHK setting on the Setup menu to your computer's handshaking method. Then, press the Ready button to re-enable printing and restart the print job from the beginning. If your computer or software does not use handshaking, you must reduce the baud rate of your computer and the printer to a rate that does not exceed the print speed.

FRAMING ERROR

This message appears when the baud rate of the printer and your computer are not the same, or the number of data bits or stop bits are not the same.

Corrective action: Press the Ready button to pause printing and then the Clear button *twice* to clear the data input buffer. Change the BAUD, DATA BITS, and STOP BITS settings on the Setup menu to match your computer's baud rate, number of data bits, and number of stop bits. Then, press the Ready button to re-enable printing and restart the print job from the beginning.

PARITY ERROR

This message appears when the printer, using the selected parity method, detects a data transmission error affecting one or more data bytes.

Corrective action: Press the Ready button to pause printing and then the Clear button *twice* to clear the data input buffer. Change the PARITY setting on the Setup menu to match your computer's parity method. Then, press the Ready button to re-enable printing and restart the print job from the beginning.

☞**Note:** If the PARITY setting is correct, then a real data communications error may have ocurred. If the error recurs, reset your computer and the printer to use no parity checking and try again.

Correcting Printer Errors

Printer errors occur when the printer is unable to continue printing due to a malfunctioning printer component. When a printer error occurs, you must turn off the printer and perform the corrective action.

CARRIAGE ERROR

This error message appears when the printer is unable to detect the carriage at the home position due to a jammed ribbon, dirty carriage shaft, or malfunctioning carriage home sensor.

Corrective actions:

- ✓ Try replacing the ribbon cartridge with another as described in *Installing the Ribbon Cartridge* in the *Set Up* section of this guide.
- ✓ If the error recurs, try cleaning the carriage shaft as described in *Cleaning the Main Carriage Shaft* in the *Cleaning and Maintenance* section of this guide.
- ✓ If the error still recurs, the carriage home sensor or tripping tab needs to be adjusted or replaced. Contact your Service Representative for assistance.

OUT OF MEMORY!

This error message appears when printer the does not contain enough memory to perform the current action.

Corrective action: Cycle the printer power and restart the print job from the beginning. If the error recurs, contact your Service Representative for assistance.

PROM CRC FAILURE

This error message appears when printer logic detects defective read-only memory.

Corrective action: Contact your Service Representative for assistance.

RAM TEST FAILURE

This error message appears when printer logic detects defective random-access memory.

Corrective action: Contact your Service Representative for assistance.

TOO MANY SETUPS!

This error message appears when there is not enough space in the printer's non-volatile memory to store the printer settings you are trying to save.

Corrective action: Using the RSTOR parameter on the Setup menu, res-tore the *Fctry* (factory) settings. Then, use the SAVE parameter to save the factory settings under several of the *Usr* names. These actions free up space in the non-volatile memory. Then, reset the Setup menu parameters to the settings you want to save and try the SAVE operation again.

USER CRC ERROR

This error message appears when printer logic detects defective non-volatile memory.

Corrective action: Contact your Service Representative for assistance.

Troubleshooting Problems

If you experience a printer problem that you cannot correct, consult the following troubleshooting guide for assistance. If you are still unable to solve the problem, contact your Service Representative.

Table 6-1. Troubleshooting Guide

Symptom	*Probable Cause/Corrective Action*
Printer does not turn on; control panel is blank.	✓ Power cable is not plugged into power outlet or printer. Check cable. ✓ Power outlet is not supplying voltage. Check outlet with another appliance. ✓ Main power fuse is blown or defective. Check fuse and replace if necessary.
Error message appears.	✓ Find error message in this section and perform corrective action(s).
Self test does not operate and no error message is displayed.	✓ Printer requires service; contact your Service Representative for assistance.
Control panel buttons do not work.	✓ Printing is in progress. Wait until printing stops or press Ready button to pause printing. ✓ Control panel is locked. Unlock control panel, if necessary.
Select-dial does not move paper.	✓ Printing is not paused. Press Ready button and try again.

Table 6-1. Troubleshooting Guide—continued

Symptom	*Probable Cause/Corrective Action*
Self test runs ok, but printer remains idle when computer sends print data.	✓ Printing is paused; press Ready button. ✓ Wrong INTRFCE setting on Setup menu. Check setting. ✓ Interface cable to computer is loose, defective or wired incorrectly. Check interface cable. ✓ Computer is sending data to wrong output port. Check port assignment. ✓ Interface is fouled up. Turn computer and printer off, then back on. Or, try a different output port.
Printing is too light.	✓ Ribbon is worn. Replace ribbon cartridge. ✓ Print density fine-adjustment is set too light. Hold down Print Density button and re-adjust print density. ✓ PH GAP and PFORCE parameters on Setup menu are not set to *Auto,* or settings are incorrect. Check settings. ✓ Ribbon cartridge is not fully seated on carriage. Re-install ribbon cartridge.

Table 6-1. Troubleshooting Guide—continued

Symptom	*Probable Cause/Corrective Action*
Printing is smearing.	✓ Print density fine-adjustment is set too dark. Hold down Print Density button and re-adjust print density. ✓ PH GAP and PFORCE parameters on Setup menu are not set to *Auto,* or settings are incorrect. Check settings. ✓ Ribbon is tangled. Correct problem or replace ribbon cartridge. ✓ Small piece of paper or debris is lodged in front of printhead. Remove obstruction. ✓ Paper is not taut between the tractors or around the platen. Reload paper.
Large portions of characters are not printing.	✓ Ribbon is tangled. Correct problem or replace ribbon cartridge.

Table 6-1. Troubleshooting Guide—continued

Symptom	*Probable Cause/Corrective Action*
Characters are missing one or more dots.	✓ Print density fine-adjustment is set too light. Hold down Print Density button and re-adjust print density. ✓ PH GAP and PFORCE parameters on Setup menu are not set to *Auto,* or settings are incorrect. Check settings. ✓ Printhead is damaged or worn. Replace printhead.
Printer prints garbled text and paper moves erratically.	✓ Wrong printer emulation selected. Make sure computer and printer are set for same printer emulation.
Single sheets do not feed properly.	✓ Paper is not loaded properly. Refer to *Loading Paper* section for detailed procedure. ✓ Wrong paper path selected. Make sure *Top* paper path is selected. ✓ PH GAP and PFORCE parameters on Setup menu are not set to *Auto,* or settings are incorrect. Check settings.

Table 6-1. Troubleshooting Guide—continued

Symptom	*Probable Cause/Corrective Action*
Selected printer settings change before printing begins.	✓ Application program is overriding your settings. Change printer setup in your applica- program.
Pin-fed forms do not load properly.	✓ Forms are not loaded properly. Refer to *Loading Paper* section for detailed procedures. ✓ Wrong paper path selected. Make sure *Rear* (or *Bottom*) paper path is selected. ✓ Print density fine-adjustment is set too dark. Hold down Print Density button and re-adjust the print density. ✓ PH GAP and PFORCE parameters on Setup menu are not set to *Auto,* or settings are incorrect. Check settings. ✓ Paper is not taut between tractors or around platen. Reload paper.

Table 6-1. Troubleshooting Guide—continued

Symptom	*Probable Cause/Corrective Action*
Multipart forms or labels tear during printing. Or, labels peel off the backing sheet during printing.	✓ Print density fine-adjustment is set too dark. Hold down Print Density button and re-adjust print density. ✓ PH GAP and PFORCE parameters on Setup menu are not set to *Auto,* or settings are incorrect. Check settings. ✓ Forms or labels are too thick to feed around platen. If media is pin-feed and you have a top-mounted pull tractor option, or your printer has bottom-feed tractors, try feeding forms from bottom of printer.
Printing goes off right side of page.	✓ WIDTH setting on Setup menu is incorrect. Check setting.
Lines of text print on top of one another.	✓ AUTO LF mode on Setup menu is off. Turn it on. ✓ Paper is not taut between tractors or around platen. Reload paper. ✓ Wrong paper path selected. Check paper path selection.

Table 6-1. Troubleshooting Guide—continued

Symptom	*Probable Cause/Corrective Action*
Printer leaves blank line after every print line.	✓ AUTO LF mode on Setup menu is on. Turn off mode. ✓ LPI setting on Setup menu is incorrect. Check setting.
Carriage does not return to left margin before printing next line.	✓ AUTO CR mode on Setup menu is off. Turn on mode.
Printer only prints hexadecimal numbers.	✓ EMUL parameter is set to *HexMode*. Change setting.
Printing does not start at far left print position.	✓ LFT MAR setting on Setup menu is incorrect. Check setting.
Printer prints on pin-feed paper perforations.	✓ Top-of-form is set incorrectly. Advance paper until first print line is under guide lines on print-line indicator and press Alt and Set Top buttons. ✓ LENG setting on Setup menu is incorrect for paper you are using. Check setting. ✓ AUTO FF mode on Setup menu is off. Turn on mode.
Printing starts too far down the page.	✓ TOP MAR setting on Setup menu is incorrect. Check setting.
Last line(s) on page print on top of next page.	✓ LPI, LENG, TOP MAR, or BOT MAR setting on Setup menu is incorrect. Check these settings.

Table 6-1. Troubleshooting Guide—continued

Symptom	*Probable Cause/Corrective Action*
Characters overlap each other or there are wide gaps between them.	✓ CELL setting on Setup menu is incorrect. Check setting.
Double-high text overlaps text on the next line.	✓ Leave a blank line after every double-high line of text.
Double-wide characters overlap.	✓ Leave a blank space after every double-wide character.
Foreign symbols replace some of the standard ASCII characters.	✓ LANG setting on Setup menu is incorrect. Check setting.
Vertical line drawing and component characters do not align.	✓ Change BI-DIR setting on Setup menu to *Off*.
Printing only occurs from left-to-right—not in both directions.	✓ Change BI-DIR setting on Setup menu to *Text*, *Graf*, or *Full*.
Some of the IBM graphics characters do not print or print as italic characters.	✓ SETS setting on Setup menu is incorrect. Check setting.
Printing is not in color.	✓ Color ribbon cartridge is not installed. ✓ Tab on bottom of color ribbon cartridge is broken off. Replace ribbon cartridge.
Printing continues past physical bottom edge of page on cut sheets, intead of using LENG setting.	✓ PGE END setting on Setup menu is *Off*. Change setting to *On*.
Printer not leaving blank lines (losing line feeds) at top of cut sheets.	✓ PGE END setting on Setup menu is *Off*. Change setting to *On*.

Table 6-1. Troubleshooting Guide—continued

Symptom	*Probable Cause/Corrective Action*
Printer ejects cut sheets before finishing printing on page.	✓ PGE END setting on Setup menu is *On*. Change setting to *Off*. ✓ LENG setting on Setup menu does not reflect actual length of page in use. Change setting.
Forms jam in printer while using demand document mode.	✓ Forms are snagging on print-head during reverse feed. Change DEMAND setting to *Tear* and try again.
Control panel display goes blank during printing.	✓ Static shock may have interfered with display. When print job is finished and printer is idle, turn printer off, wait five seconds, and turn printer back on.
Paper park, demand document mode, or popup mode does not operate.	✓ PATH parameter on Setup menu is set to *TopTrac*. Change setting to *None*.

Running Printer Tests

From the Setup menu, you can run tests to check the following: memory, sensors, ribbon alignment, printing alignment, paper sensor, carriage, and platen.

Checking Memory

The memory test checks printer memory by writing data patterns to all memory locations and reading back the data patterns to verify that they are correct.

`4) TEST: Memory`	To run the test, display the TEST parameter on the Setup menu and select *Memory*.
`MEMORY TEST...`	When you release the Alt button, the printer *beeps*, flashes the Ready light, and executes the test.
`4) TEST: Memory`	If the test is successful, the printer redisplays the Setup menu.
`RAM TEST FAILURE` `PROM CRC FAILURE`	If the test fails, an error message will appear. If an error message appears, you should contact your Service Representative for assistance.

Checking Sensors and Switches

The printer can perform an interactive test to check printer sensors and switches. During the test, you are required to perform various actions so that the printer can check the sensors and switches for normal operation. You can check sensor and switches in any order and you can terminate the test whenever you want.

`4) TEST:Sensor`	To run the test, display the TEST parameter on the Setup menu and select *Sensor*.
`SENSOR TEST...`	When you release the Alt button, the printer *beeps*, flashes the Ready light, and executes the test. You can now test printer sensors and switches by performing the appropriate action.
`Sensor: TopCover`	For example, to test the top cover switch, raise the top cover. If the test is successful, a confirmation message appears. If the test fails, the message does not appear.
`Sensor: Gap 1` `Sensor: Gap 2`	With the top cover open, you can test other sensors. To test the print gap sensors, push the carriage forward and backward and look for the confirmation messages.
`Sensor: CarrHome`	To test the carriage sensor, slide the carriage to the far left.
`Sensor: Paper`	To test the paper sensor, insert and remove paper between the paper sensor on the print-line indicator and the platen.
`Sensor: RibnHome`	To test the ribbon home switch, remove the ribbon cartridge and press on the switch.
`Sensor: ColorRbn`	To test the color ribbon switch, remove the ribbon cartridge and press on the switch.

Checking Sensors and Switches—continued

Sensor: Rear Jam
Sensor: Bot Jam
Button: Setup
Button: Quality
Button: Font
Button: Test
Button: Clear
Button: Bail
Button: Alt
Button: PaprPark
Button: PaprPath
Button: LineFeed
Button: FormFeed
4) TEST: Sensor

To test the rear and bottom paper jam sensors, turn the wheel on each sensor.

To test a control panel button, just press the button and look for a confirmation message. Pressing the Ready button terminates the test.

☞**Note:** If you are unable to get a confirmation message, the selected sensor or switch is malfunctioning. Contact your Service Representative for help.

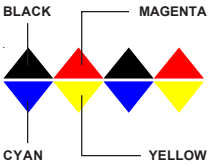
To stop the test and return to the Setup menu, press the Ready button.

Checking Ribbon Alignment

The ribbon alignment test checks for proper alignment of the ribbon. The test prints two rows of triangles for each of the possible RIBBON parameter settings, with an asterisk next to the rows that print with the currently-selected RIBBON parameter setting. By looking at this test pattern, you can determine whether the currently-selected RIBBON parameter setting is providing the optimal ribbon alignment or not.

4) TEST: Ribbon

To run the test, display the TEST parameter on the printer's Setup menu and select *Ribbon*. When you release the Alt button, the printer will print the test pattern.



Color ribbons are optimally aligned when the triangles in the top row alternate between black and magenta (pink) and the triangles in the bottom row alternate between cyan (light blue) and yellow. The color should not vary within any single triangle. The RIBBON value that prints to the left of the optimal triangle rows is the correct RIBBON parameter setting. If an asterisk also prints to the left of the RIBBON value, then the RIBBON parameter is already set to the optimal setting. If not, you should change the RIBBON parameter setting using the *Aligning the Ribbon* procedure described later in this section.

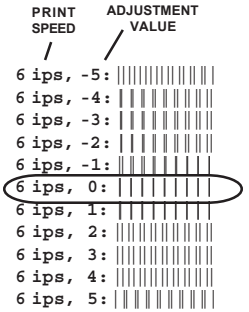
Monochrome ribbons are optimally aligned when all portions of all the triangles in both rows print. If more than one set of triangle rows is complete, the optimal RIBBON parameter setting is the one in the middle. If an asterisk also prints to the left of this line, then the RIBBON parameter is already set to the optimal setting. If not, you should change the RIBBON parameter setting using the *Aligning the Ribbon* procedure described later in this section.

Checking Printing Alignment

The printing alignment test checks to make sure that left-to-right printing aligns with right-to-left printing. The test prints a row of vertical lines with the carriage moving from left-to-right. Then, the test prints another row of vertical lines on top of the first line with the carriage moving from right-to-left. This repeats for all possible alignment values and for four different print speeds (6, 12, 24 and 48 inches per second). By looking at this test pattern, you can determine whether bi-directional printing is properly aligned.

4) TEST: Align

To run the test, display the TEST parameter on the printer's Setup menu and select *Align*. When you release the Alt button, the printer will print the test pattern.



The optimal row of vertical lines is the one where the second pass of vertical lines prints exactly on top of the first pass. You cannot see any evidence of the two printing passes. If your printer is aligned, the optimal row of vertical lines should print within the adjustment value range of -2 to +2. This should be the case for each of the four print speed patterns.

If you determine that your printer is not aligned properly, contact your Service Representative for assistance.

Re-Calibrating the Paper Sensor

The paper sensor test adjusts the sensitivity of the paper sensor so that it can accurately sense paper in the printer. It is only necessary to run this test if the RUN PCALIB TEST error message appears, or if erroneous LOAD PAPER or CLEAR PAPER JAM errors occur.

Before you run the test, make sure that paper is *not* loaded in the printer.

4) TEST: Pcalib

Then, display the TEST parameter on the Setup menu and select *Pcalib*.

When you release the Alt button, the printer will begin moving the carriage and rotating the platen. During the test, printer logic will analyze data supplied by the paper sensor from various locations around the platen. From this data, printer logic can determine the amount of reflectivity that the paper sensor must sense to properly detect paper in the printer. This amount of reflectivity is called the *paper threshold* and the printer will reset the normally-hidden PTHRESH parameter to this value. Refer to *Fine-Adjusting the Paper Sensor* later in this section for more information on the PTHRESH parameter.

When the test concludes, the Setup menu reappears.

☞**Note:** If you attempt to run this test with paper loaded in the printer, the UNLOAD PAPER error message will appear to warn you. If this message appears when paper is not loaded, you must set the normally-hidden PTHRESH parameter to a higher value before you can run the test. Refer to *Fine-Adjusting the Paper Sensor* later in this section for information on setting the PTHRESH parameter.

☞**Note:** If the paper sensor test sets the PTHRESH parameter to a value or *150 or lower*, the platen surface is too dirty (reflective) for reliable paper sensing to occur. To correct this problem, perform the *Cleaning the Platen and Bail Rollers* procedure in the *Cleaning and Maintenance* section of this guide. Then, rerun the paper sensor test.

Checking Carriage Movement

The random printing test exercises the carriage, carriage belt, and carriage motor. During the test, the printer moves the carriage erratically and prints a pattern of characters using various fonts, qualities, and character cell sizes. The width of the test pattern is determined by the WIDTH parameter setting on the Setup menu. By looking at the test pattern, you can determine if the carriage is slipping due to a loose carriage belt or pulley, or a malfunctioning carriage motor.

Before you run the test, make sure that paper is loaded in the printer.

Then, display the TEST parameter on the Setup menu and select *Random*.

When you release the Alt button, the printer will begin printing the test pattern. After printing several pages, press the Ready button to terminate the test. The Setup menu will reappear.

If there is a problem with carriage movement, you will see characters in the test pattern that overprint other characters. You may also notice that the left margin shifted left or right as the test progressed. If you see these problems in the test pattern, you should contact your Service Representative for assistance.

Checking the Platen

The gap test prints a table of printhead gap values measured across and around the surface of the platen. From this table, you can verify platen parallelism and identify flaws, such as lumps, dents, or cracks, in the surface of the platen.

Before you run the test, make sure that paper is loaded in the printer. On *wide*-carriage models, load paper that is at least 14 inches (35.5 cm) wide. On *narrow*-carriage models, load paper that is at least 8.5 inches (21.6 cm) wide.

Then, display the TEST parameter on the Setup menu and select *Gap*.

```
gap values:   46 42 42 44
45
gap values:   46 41 41 45
46
gap values:   45 42 40 44
45
gap values:   45 43 44 44
44
gap values:   44 42 43 45
45
gap values:   45 42 42 44
45
gap values:   45 43 43 44
44
gap values:   41 42 43 42
44
gap values:   45 43 42 44
45
gap values:   46 44 45 45
45
gap values:   46 42 44 41
45
gap values:   46 42 42 44
45
```

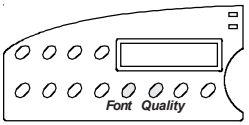
When you release the Alt button, the printer will begin moving the carriage to various locations across the platen. At each location, the printhead will re-gap automatically. After measuring printhead gaps across the platen, the printer will print out the gap values. Then, the platen will rotate slightly and the process will repeat. After printing about 20 lines of gap values, press the Ready button to terminate the test. The Setup menu will reappear.

If there is a problem with platen parallelism, the printhead gap values in each line will tend to increase or decrease linearly when read from left-to-right. If there are flaws in the platen surface, there will be an exceptionally high or low gap value in the table. If you see these problems in the test pattern, contact your Service Representative for assistance.

Using Hidden Parameters

The Setup menu also contains hidden parameters that are only accessible by pressing a certain combination of control panel buttons. These parameters are hidden since they are set at the factory and there is seldom a need for printer operators to use them. Furthermore, if these parameters are set incorrectly, poor print quality and performance can result. When these parameters are set correctly however, these parameters fine adjust and fully optimize print quality and other printer characteristics.

The SAVE and RSTOR printer functions do not affect hidden parameter settings, since the printer does not save hidden parameter settings as part of the *Usr 1* to *Usr 5* profiles. Instead, the printer retains only one setting for each hidden parameter and this setting affects all future printing.



To access the hidden parameters, press the Setup button to display the Setup menu. Turn the Select-dial until the last parameter in the menu is displayed. Then, hold down both the Font and Quality buttons and turn the Select-dial to display the hidden parameters.

51) RIBBON: -2 *Aligning the Ribbon*

RIBBON fine-adjusts the vertical positioning of the ribbon in front of the printhead. This ensures that the color bands on color ribbons are correctly registered with the printhead and that monochrome ribbons are not raised or lowered too far. To determine the correct setting for this parameter, perform the *Checking Ribbon Alignment* procedure described earlier in this section. From the test pattern, you can determine the opti-mal RIBBON parameter setting. RIBBON parameter settings range from *-8* to *2*. After you change this parameter, the printer prints a test pattern using the new RIBBON setting so that you can verify ribbon registration.

52) PTOP: 0/60"

Fine-Adjusting the Top-Of-Form Position

PTOP lets you add or subtract an offset distance to the leading edge of the paper on initial load to force the top-of-form position up or down the page. The printer determines the top-of-form position on a page using a paper sensor located near the printhead. This paper sensor can detect the leading edge of a page as it loads into the printer. Then, the printer indexes down one line space to locate the base line of the first print line (top-of-form). If a top margin has been defined, the printer also adds this distance. The offset distance is expressed in 1/60-inch increments. PTOP parameter settings can range from *-20* to *40*. Negative settings move the top-of-form position farther up the page and positive settings move it farther down.

53) TEAR: 0/30"

Fine-Adjusting the Forms Tear-Off Position

TEAR lets you fine-adjust the distance that a form advances when it is presented for tear-off in the demand document mode. This parameter ensures that the perforation on the form properly aligns with the tear bar on the platen window. The fine-adjustment is expressed in 1/30-inch increments. TEAR parameter settings can range from *-26* to *9*. Negative settings decrease the distance that forms advance and positive settings increase the distance.

54) HOME: 0/120"

Fine-Adjusting the Carriage Home Position

HOME lets you fine-adjust the carriage home position, which determines the location of the leftmost print position on a page. This parameter ensures that the leftmost print position aligns exactly with the "0" mark on the paper scale. The fine-adjustment is expressed in 1/120-inch increments. HOME parameter settings can range from *-6* to *24*. Negative settings move the carriage home position farther left and positive settings move it farther right.

55) PTHRESH: 208

Fine-Adjusting the Paper Sensor

PTHRESH lets you fine-adjust the amount of reflectivity that the paper sensor must sense before printer logic recognizes that paper is loaded in the printer. This parameter ensures that the printer does not falsely detect paper from a dirty or shiny platen, or fail to detect paper that is off-white in color. You can set the PTHRESH parameter to the optimal setting automatically by performing the *Re-Calibrating the Paper Sensor* procedure described earlier in this section. The purpose of the PTHRESH parameter is to allow you to fine-adjust the automatic setting. PTHRESH parameter settings range from *0* to *255*. Lowering the setting causes printer logic to require more reflectivity (whiteness) before recognizing paper and increasing the setting causes printer logic to require less reflectivity.

☞**Note:** If the paper sensor re-calibration sets the PTHRESH parameter to a value or *150 or lower*, the platen surface is too dirty (reflective) for reliable paper sensing to occur. To correct this problem, perform the *Cleaning the Platen and Bail Rollers* procedure in the *Cleaning and Maintenance* section of this guide. Then, perform the *Re-Calibrating the Paper Sensor* procedure again.

56) UNAMS: None *Changing User Names*

UNAMS lets you rename each of the printer's five user names (that is, *Usr 1*, *Usr 2*, *Usr 3*, *Usr 4*, and *Usr 5*). You can change these default names to names that are more meaningful to your particular needs. For example, if you print five different forms, each requiring a unique printer setup, you could change *Usr 1* to the name of the first form, *Usr 2* to the name of the second form, and so on. Or, if five different operators use the printer and each operator requires there own printer settings, you could change the user names to the five operators' names. The new names that you assign can be from 1 to 6 characters in length. You cannot rename the *Fctry* name, which saves the printer's factory default printer settings.

To rename the user names, use the following procedure:

Hold down the Alt button and turn the Select-dial to choose a name to change. When you release the Alt button, a flashing cursor box appears on the display to indicate the position where you can change a character.

Now, turn the Select-dial to cycle through the available characters. You can choose from many letters, numbers and symbols.

To move to the next character position, press the Alt button. Continue until you finish entering the new name.

When the cursor passes the last position, the printer saves the new name automatically. Your new name will now appear as a selection for the RSTOR, SAVE, and DFALT parameters and will print on *Printer Status Reports*.

☞**Note:** While entering a new name, you can start over at any time by pressing the Clear button. To restore the original name, press the Clear button again. To toggle between the last entered name and the factory default name, press the Clear button several more times.

57) PANEL: Unlock *Locking Control Panel Functions*

PANEL lets you lock control panel functions to prevent casual users from making unauthorized changes to the printer's setup and configuration. At this parameter, you can select *Unlock*, which allows all control panel func-tions to operate normally; *Lock,* which locks the entire Setup menu and the Print Density, Quality, Font, Emul, Pitch, and Color button functions; or *Custom,* which allows you to lock any combination of control panel functions.

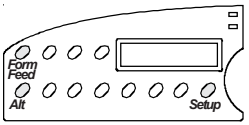
To define a custom control panel lock, use the following procedure:

57) PANEL: Custom

LOCKED

UNLOCKED

At the PANEL parameter, select the *Custom* setting. After releasing the Alt button, press the control panel buttons that you want to lock. When you first press a button, the display shows whether the button is currently LOCKED or UNLOCKED. To change the status, press the button again. To accept your custom lock selections, press the Ready button. To exit the Setup menu, press the Setup button.



To *temporarily* unlock all control panel functions, hold down the Alt and Form Feed buttons and press the Setup button twice. To re-lock the control panel functions, press this button combination again.

To *permanently* unlock all control panel functions, hold down the Alt and Form Feed buttons and press the Setup button twice. Then, set the PANEL parameter on the Setup menu to the *Unlock* setting.

Disabling the Cover Open Interlock

Should you need to operate the printer with the top cover raised, you can reverse the polarity of the cover open interlock switch. This causes the printer to disable printing and display the LOWER TOP COVER message when the top cover is lowered and print normally when the top cover is raised.

⚠ **Warning:** The printer carriage moves at high velocities and there are sharp edges inside the printer. Personal injury could result from printing with the top cover raised.

To reverse the polarity of the cover open interlock switch, perform the following procedure:

1. Load a sheet of paper in the printer and press the Test button to start printing a self test pattern.
2. With printing in progress, raise the top cover. Printing will stop and the LOWER TOP COVER error message will appear on the control panel display.
3. Hold down the Alt button and press the Form Feed button.
4. Press the Ready button to clear the error. Printing can now occur with the top cover raised.

To change the polarity of the cover open interlock switch back to the normal setting, perform the following procedure:

1. Lower the top cover.
2. Press the Test button. The LOWER TOP COVER error message will reappear.
3. Hold down the Alt button and press the Form Feed button.
4. Press the Ready button to clear the error. The cover open interlock is now restored to normal operation.

☞**Note:** The polarity of the cover open interlock is always restored to normal when the printer is turned on or reset.

Appendix

A

Bottom-Feed Tractors

AMT ACCEL-6310d and -6350d models include powered, bottom-feed tractors in addition to the rear-feed tractors. This appendix describes how to select a printer stand, activate the bottom-feed tractors, load paper, alternate between paper paths, and correct bottom-feed tractor problems.

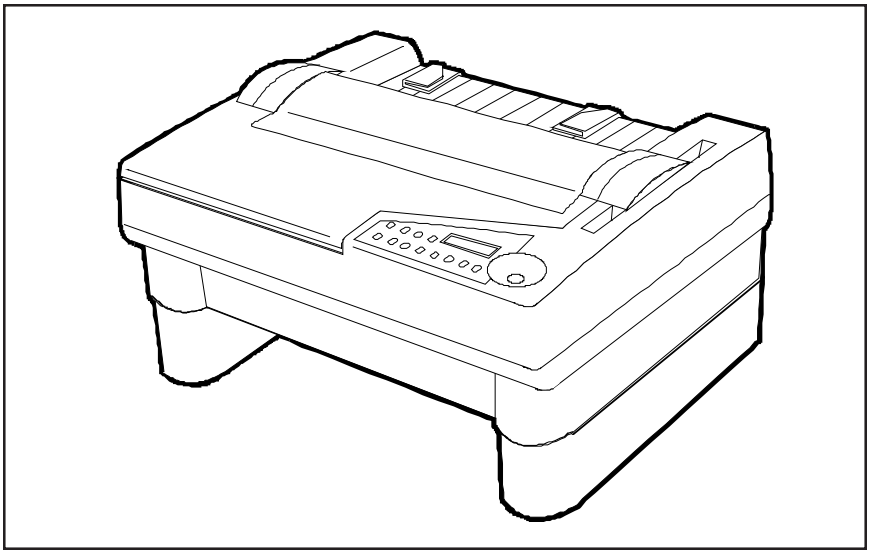


Figure A-1. Printer With Bottom-Feed Tractors

Selecting a Printer Stand

You'll need a sturdy printer stand with a paper slot through which paper can be fed. The paper slot permits pin-feed paper to feed straight up from below the printer to the bottom-feed tractors. When selecting a printer stand, observe the following guidelines:

- ✓ The stand must be sturdy enough to support the weight of the printer: 54 pounds (24.5 kg) for *wide*-carriage models or 48 pounds (21.8 kg) for *narrow*-carriage models.
- ✓ The table top must be wide enough to hold the printer: 24 inches (61 cm) for *wide*-carriage models or 19 inches (48.3 cm) for *narrow*- carriage models. It must also be at least 17 inches (43.2 cm) deep.
- ✓ The paper slot must be wide enough for the paper you intend to use and at least 1.5 inches (3.8 cm) deep.
- ✓ The stand should contain shelves or bins for paper entering and exiting the printer.

Activating the Bottom-Feed Tractors

To activate the bottom-feed tractors so that they will feed paper, press the Paper Path button on the control panel as needed to select the *Bottom* paper path.

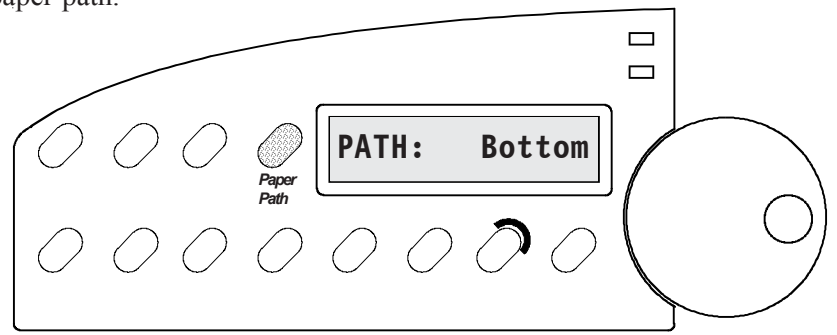


Figure A-2. Selecting the Bottom Path

Accessing the Bottom-Feed Tractors

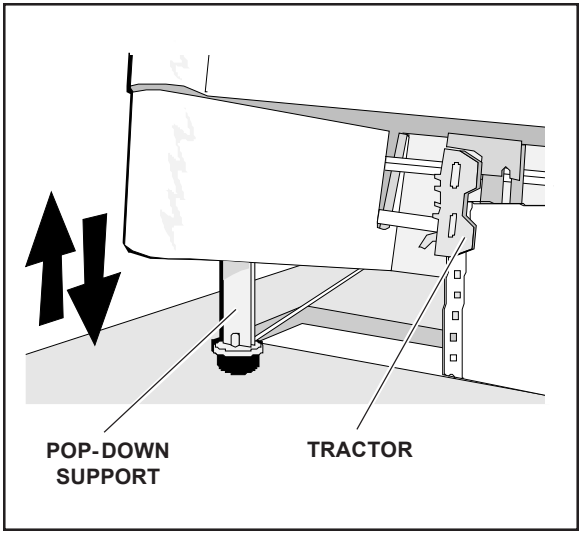


Figure A-3. Raising and Lowering the Printer

There are pop-down supports on the bottom of the printer that extend to lift up the front of the printer. This allows easier access to the bottom-feed tractors.

To use the pop-down supports, lift up the front edge of the printer until the pop-down supports are fully extend. Then, lower the front edge of the printer. The pop-down supports will lock into place and support the weight of the printer. You are now ready to load paper in the bottom-feed tractors.

To retract the pop-down supports after you load paper, just lift up the front edge of the printer again. This time the pop-down supports will unlock and retract into the holes on the bottom of the printer.

Loading Paper in the Bottom-Feed Tractors

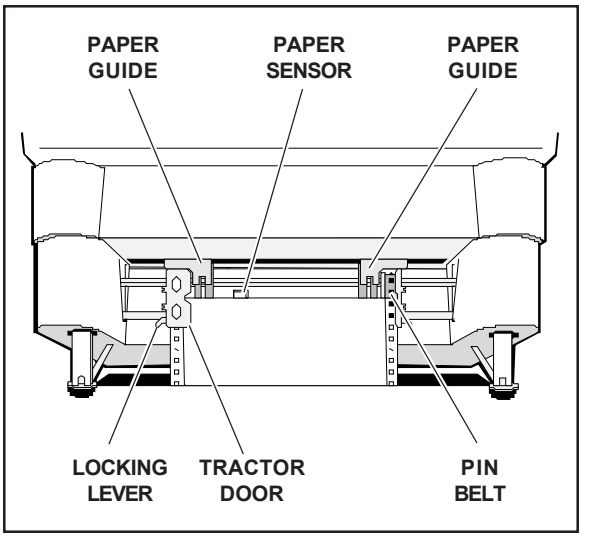


Figure A-4. Loading Paper in the Bottom Path

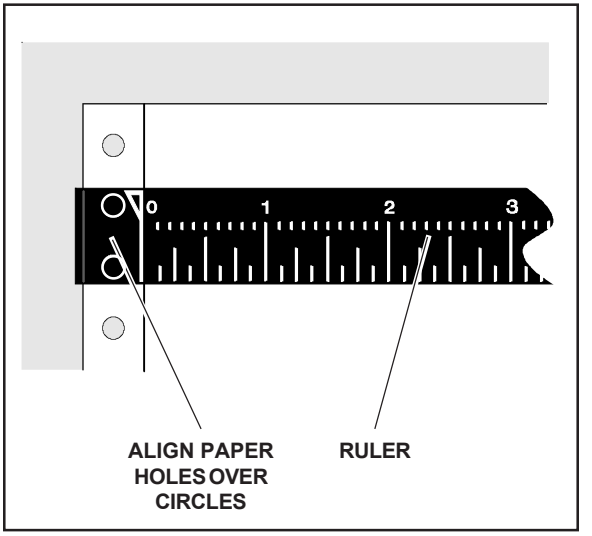


Figure A-5. Aligning Paper in the Bottom Path

To load pin-feed paper into the bottom-feed forms tractors, use the following procedure:

1. Raise the front of the printer onto the pop-down supports.
2. Pull forward on the tractor locking levers so that the tractors can slide freely on the shafts.
3. Open both tractor doors.
4. Push the leading edge of the paper up through the slot in the printer stand and mount the first three paper holes onto the tractor pin belts. Then, close the tractor doors to secure the paper in place.
5. Slide the tractors and paper left or right as needed until the paper holes on the left side of the paper align with the circles on the ruler, as shown in figure A-4. Then, push back the left tractor locking lever to lock that tractor in place.
6. Slide the right tractor to the right until the paper is snug between the tractors. Then, push back the right tractor locking lever to lock that tractor in place. Make sure that the paper is not too tight or too loose between the tractors, since this could cause paper feeding problems.
7. Press the Form Feed button on the control panel. The paper will advance to the ready-to-print position.
8. Lower the front of the printer.

Using the Bottom-Feed Tractors

With the bottom-feed tractors activated and paper loaded, you can use the bottom-feed tractors just like the rear-feed tractors. All of the printer's special paper handling features, such as demand document mode and paper parking, are fully supported. For detailed information on the printer's paper handling features, refer to the *Loading Paper* section of this guide.

Alternating Between Paper Paths

You can load one kind of pin-feed form through the rear forms tractors and another kind through the bottom-feed forms tractors. You can then switch between these forms without having to manually reload forms. To change between the rear and bottom paper paths, use the following procedure:

1. Tear off all but the last page that has exited the printer.
2. With the printer paused or idle, press the Paper Park button to reverse feed the paper that is loaded in the printer into the parked position.
3. Press the Paper Path button on the control panel as needed to select the desired paper path (*Rear* or *Bottom*).
4. Press the Form Feed button to advance the paper into the ready-to-print position or just send data to the printer and the paper will load automatically.

Troubleshooting

If you experience a problem while using the bottom-feed forms tractors, consult the following table for assistance. This troubleshooting information pertains only to the bottom-feed forms tractors. For additional troubleshooting information, refer to the *Solving Problems* section.

Table A-1. Troubleshooting the Bottom-Feed Tractors

Symptom	*Probable Cause/Corrective Action*
Tractors are hard to reach and adjust while loading paper.	✓ Raise front of printer onto pop-down supports.
Pop-down supports don't lock into place or won't unlock.	✓ Lift front edge of printer until supports are fully extended and off of printer stand. If necessary, gently rock supports forward and backward until they slide into place.
When you press Form feed button, paper does not advance.	✓ Bottom-feed tractors are not activated. Press Paper Path button as needed to select *Bottom* paper path.
Paper advances but jams before entering bottom of printer.	✓ Paper is misaligned on bottom-feed tractors. Reload paper.
Paper advances into printer but jams inside.	✓ Printhead is too close to platen. Make sure PH GAP and PFORCE parameters on Setup menu are set to *Auto.*
	✓ A torn or crumpled piece of paper is blocking paper entry slot. Inspect bottom paper entry slot and remove debris.

Table A-1. Troubleshooting the Bottom-Feed Tractors—continued

Symptom	*Probable Cause/Corrective Action*
Printer does not present form for tear-off when you press Ready button.	✓ Demand document mode is not selected or is set incorrectly. Check DEMAND parameter setting on Setup menu.
Print is smearing.	✓ Paper is not snug between tractors. Adjust tractors. ✓ Printhead is too close to platen. Make sure PH GAP and PFORCE parameters on Setup menu are set to *Auto*.
Printing occurs on paper tear strips.	✓ Paper is misaligned in the printer. Refer to *Loading Paper in the Bottom-Feed Tractors* in this appendix. ✓ Paper is too narrow. Use paper that is at least 4.5 inches (11.4 cm) wide including the perforated tear strips.

Appendix

B

Bar Codes

This appendix describes the printer's bar code symbologies (formats) and explains how to configure the printer to print bar codes. For programming information, refer to the *AMT Datasouth Bar Code Option Operating Guide* (part no. 337027) sold separately by AMT Datasouth.

Introducing Bar Codes

A bar code symbol consists of parallel lines and spaces of varying widths or heights. The bar code symbology describes unambiguous rules for encoding data into the bars and spaces.

Bar Code Symbologies

The printer supports the following bar code symbologies:

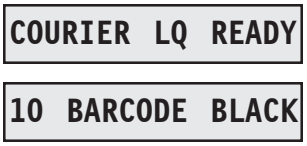
- ✓ *Interleaved 2-of-5*. This is a variable-length, self-checking numeric bar code mainly used in the distribution industry.
- ✓ *Code 3-of-9*. This is a variable-length, self-checking, alphanumeric bar code widely used in the automotive industry and many other non-retail industries.

- ✓ *Codabar*. This is a variable-length, self-checking, alphanumeric bar code that can encode digits 0 through 9 and six additional characters. The code is commonly used in libraries, blood banks and air parcel express applications.
- ✓ *UPC-A*. This is a fixed-length, self-checking, numeric bar code used throughout the supermarket and retail industries to identify a product and its manufacturer. UPC-A encodes a series of 12 digits.
- ✓ *UPC-E*. This is a shortened version of UPC-A that encodes six of the 12 digits in a UPC-A message.
- ✓ *EAN-13*. This is a variation of the U.S.-developed UPC bar code for-mat adopted for the international marketplace. It, like UPC-A, is a fixed-length, self-checking, numeric bar code. EAN-13 encodes a series of 13 digits: 12 directly into the symbol and one into a parity pattern of the first six digits.
- ✓ *EAN-8*. This is a shortened version of EAN-13 that encodes a series of 8 digits.
- ✓ *Code 128*. This is a variable-length, self-checking, high-density bar code. It can encode all 128 alphanumeric ASCII characters.
- ✓ *POSTNET*. This is a self-checking, numeric bar code that encodes U.S. Postal Service 5-digit ZIP Codes, 9-digit ZIP+4 Codes, and 11-digit Delivery Point Codes.

☞**Note:** The *AMT Datasouth Bar Code Option Operating Guide* provides in-depth information on bar code formats, the component elements, and how bar code symbols are constructed.

Selecting the Bar Code Emulation

Before you can print bar codes, you must select the printer's bar code emulation.



With the status display on the control panel, hold down the Alt button and press the Emul button as needed until *BARCODE* appears; then release both buttons.

With *BARCODE* selected as the current emulation, the printer is now ready to receive bar code commands and data from your computer.

☞**Notes:** You can also select the bar code emulation via software by send-ing an escape sequence. Escape sequences are listed in the *Code Sets* appendix in this guide. With the bar code emulation selected, the printer can also receive all *Epson LQ-2550* control codes and escape sequences.

Printing Bar Codes

To print bar codes, the printer must receive special bar code commands from your computer. This requires a software application that is capable of generating and sending bar code commands to the printer. If you want to use a particular software application to print bar codes, contact the software manufacturer for specific details.

☞**Note:** If you are a programmer who would like to generate and send bar code commands from your own software applications, refer to the *AMT Datasouth Bar Code Option Operating Guide* (part no. 337027) for programming information. Also, refer to the *Code Sets* appendix of this guide for a listing of the bar code commands.

Bar Code Specifications

Table B-1 lists the printer's bar code specifications.

Table B-1. Bar Code Specifications

Item	*Specification*
Agency Compliances	
Interleaved 2-of-5, Code 3-of-9 and Codabar	American National Standard Institute (ANSI), ANSI MH10.8M-1983
UPC-A and UPC-E	Uniform Code Council, Inc., UPC Symbol Specification 1986
EAN-13 and EAN-8	International Article Numbering Assn., EAN Specification 1987
POSTNET	United States Postal Service, Publication 25
Code 128	Automatic Identification Manufacturers (AIM), Code 128 Standard
Dimensions	
Height	From 1/12 inch to 10 inches in 1/12-inch increments
Width of bars	From 0.014 to 0.504 inch wide in 0.01-inch increments
Width of spaces	From 0.006 to 0.496 inch wide in 0.01-inch increments

Table B-1. Bar Code Specifications—continued

Item	*Specification*
POSTNET Dimensions	
Height of short bars	0.050 inch (±0.010 tolerance)
Height of tall bars	0.125 inch (±0.010 tolerance)
Bar width	0.020 inch (±0.005 tolerance)
Pitch	0.0475 inch (±0.0025 tolerance)
ZIP Codes	Encodes five digits, one correction character, plus two frame bars
ZIP+4 Codes	Encodes nine digits, one correction character, plus two frame bars
Delivery Point Codes	Encodes eleven digits, one correction character, plus two frame bars
Miscellaneous	
Human-readable text	Selectable using current font selection on printer
Command set compatibility	Genicom- and OTC-compatible

Appendix

C

Interfaces

This appendix describes the printer's parallel and serial interfaces, including voltages, signals and timing, cables and connectors, pin assignments, and parameters.

Centronics Parallel Interface

The parallel interface conforms to the Centronics standard for parallel data transfer from computers to printers. The interface contains 36 lines.

Voltages

A signal on a line is either high or low, depending on the voltage level. Timed high-to-low and low-to-high transitions of a signal enable the transfer of logical information. The valid parallel voltages are as follows:

- ✓ High (+): +2.5 to +5 volts
- ✓ Low (-): -0.2 to +0.8 volts

Signals and Timing

The parallel interface consists of a data clock signal, eight data bit signals, two handshaking signals, two printer error signals, two printer control signals, two printer select signals, a power line, fifteen ground lines, and three lines that are not connected.

Data Transfer Signals

The primary function of the interface is to transfer data from the computer to the printer. This function requires eleven signals. To transfer each data byte from the computer to the printer, the following signals are sent:

- ✓ During normal operation, the computer monitors a BUSY signal from the printer. When BUSY goes low, the printer is ready to receive a data byte.
- ✓ When BUSY is low, the computer simultaneously represents the eight bits of the data byte on eight data lines—DB1 through DB8. The least significant bit (LSB) is represented on DB1, the next bit on DB2, and so on. If the bit is logical "0", the signal is low. If the bit is logical "1", the signal is high.
- ✓ After waiting at least 0.5 microsecond, the computer pulses a STROBE- signal for at least 0.5 microsecond to tell the printer that data is present on the data lines. The computer continues to hold the data on the data lines for at least 0.5 microsecond after the STROBE- pulse.
- ✓ Within 0.25 microsecond after the leading edge of the STROBE- pulse, the printer changes the BUSY signal to high to indicate that it is busy.
- ✓ During the next 5 microseconds (or more), the printer reads the data lines and transfers the byte to printer memory.
- ✓ When ready to receive another byte, the printer sets the BUSY signal back to low and pulses an ACK- signal low for at least 4 microseconds.

The timing of each event is critical. Figure C-1 shows the parallel data transfer timing diagram.

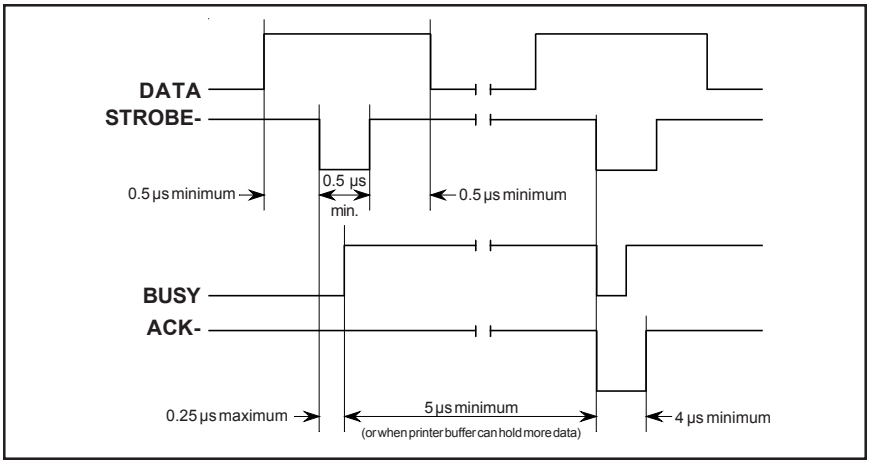


Figure C-1. Parallel Data Transfer Timing Diagram

Printer Error Signals

The printer uses two signals to notify the computer of printer errors: PAPER and ERROR-. PAPER goes high and ERROR- goes low when the printer has data to print but is out of paper. ERROR- also goes low when the printer is off-line or in an error state. PAPER returns low and ERROR- returns high when the error is corrected.

Printer Control Signals

The computer uses two signals to control certain printer operations: AUTO FEED- and IPRIME-. With AUTO FEED- low, the printer advances the paper one line after printing. With AUTO FEED- high or disconnected, no action occurs. When IPRIME- pulses low for at least 50 microseconds, the printer initializes printer settings to the defaults and clears the input buffer. With IPRIME- high or disconnected, no action occurs.

Printer Select Signals

The computer uses a SELIN- signal to select the printer to receive data. The printer uses a SELOUT signal to tell the computer that it is selected and ready to receive data. For the printer's parallel interface to operate, SELIN- must be low or disconnected. SELOUT remains high as long as SELIN- is low or disconnected.

Power Line

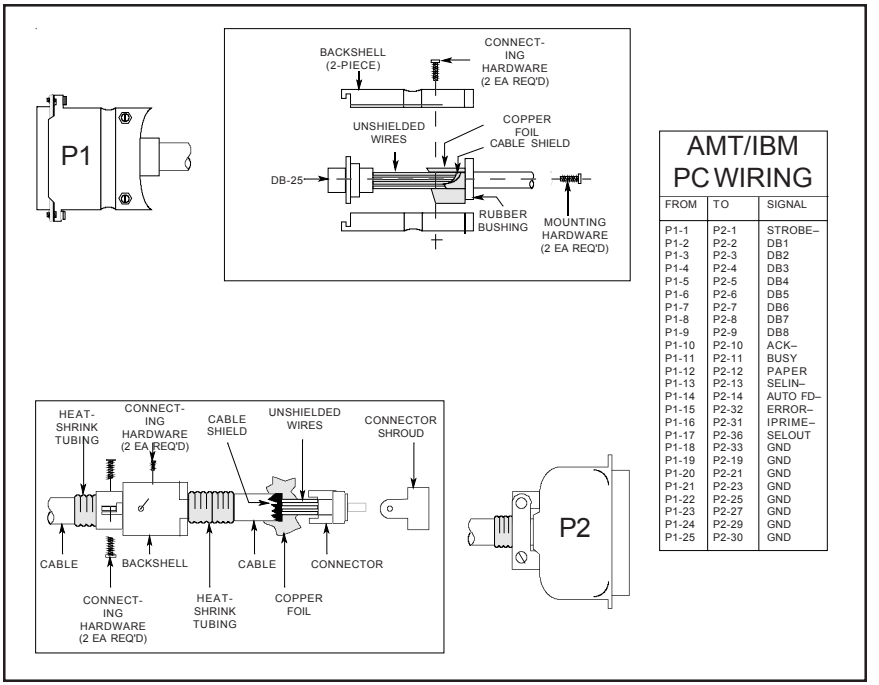
The printer provides a +5 volts dc power line to drive the logic of an external device.

Ground Lines

The printer provides fifteen ground lines consisting of a logic ground, chassis ground, and thirteen signal return grounds.

Cable/Connector Requirements

The parallel connector must be a 36-pin male plug with a metal backshell (Amphenol 157-32360 or equivalent). The cable must be shielded with twisted pair leads (Beldon 9505 or equivalent). The parallel cable must not exceed 10 feet (3 meters). Figure C-2 shows a typical parallel cable assembly.



AMT/IBM PC WIRING

FROM	TO	SIGNAL
P1-1	P2-1	STROBE–
P1-2	P2-2	DB1
P1-3	P2-3	DB2
P1-4	P2-4	DB3
P1-5	P2-5	DB4
P1-6	P2-6	DB5
P1-7	P2-7	DB6
P1-8	P2-8	DB7
P1-9	P2-9	DB8
P1-10	P2-10	ACK–
P1-11	P2-11	BUSY
P1-12	P2-12	PAPER
P1-13	P2-13	SELIN–
P1-14	P2-14	AUTO FD–
P1-15	P2-32	ERROR–
P1-16	P2-31	IPRIME–
P1-17	P2-36	SELOUT
P1-18	P2-33	GND
P1-19	P2-19	GND
P1-20	P2-21	GND
P1-21	P2-23	GND
P1-22	P2-25	GND
P1-23	P2-27	GND
P1-24	P2-29	GND
P1-25	P2-30	GND

Figure C-2. Parallel Cable Assembly

Setting Parallel Parameters

Only two Setup menu parameters affect the parallel interface: INTRFACE and STROBE. For more information on these parameters, refer to the *Control Panel* section in this guide.

Pin Assignments

Table C-1 lists the parallel connector pin assignments and signal requirements.

Table C-1. Parallel Pin Assignments

Pin	*Signal*	*Source*	*Printer Usage*
1	STROBE–	Computer	Must pulse low for at least 0.5 microsecond to clock data on DB1-DB8 lines; data must be present for at least 0.5 microsecond before and after pulse ☞**Note:** The STROBE parameter on the Setup menu lets you control whether the printer captures the data byte on the leading or trailing edge of STROBE–.
2	DB1	Computer	Must contain eight bits of parallel data byte (DB1 = LSB); high signal represents logical "1", low signal represents logical "0"
3	DB2	Computer	
4	DB3	Computer	
5	DB4	Computer	
6	DB5	Computer	
7	DB6	Computer	
8	DB7	Computer	
9	DB8	Computer	
10	ACK–	Printer	Pulses low for at least 4 microseconds when printer has received data byte on DB1-DB8 lines and is ready for another; also pulses low when printer is turned on or reset

Table C-1. Parallel Pin Assignments—continued

Pin	*Signal*	*Source*	*Printer Usage*
11	BUSY	Printer	Goes high within 0.25 microsecond after STROBE– pulse to suspend further data transfer while printer receives data byte on DB1-DB8 lines; returns low at least 5 microseconds later or when printer buffer can hold another byte
12	PAPER	Printer	Goes high when printer has data to print, but no paper is loaded
13	SELOUT	Printer	Remains high while SELIN– is low or disconnected
14	AUTO FEED–	Computer	May go low to cause printer to advance paper one line after printing; otherwise, must be high or disconnected
15			Not connected
16	LGND		Logic ground
17	CGND		Chassis ground
18	+5V	Printer	+5 volts dc, 200 mA maximum
19	GND		Ground
20	GND		Ground
21	GND		Ground
22	GND		Ground
23	GND		Ground
24	GND		Ground
25	GND		Ground
26	GND		Ground
27	GND		Ground
28	GND		Ground
29	GND		Ground
30	GND		Ground

Table C-1. Parallel Pin Assignments—continued

Pin	*Signal*	*Source*	*Printer Usage*
31	IPRIME–	Computer	May pulse low for at least 50 micro-seconds to initialize printer settings to defaults and clear input buffer; otherwise, must be high or disconnected
32	ERROR–	Printer	Goes low when printer has data to print but is out of paper, off-line, or in error state; returns high when condition is corrected
33	GND		Ground
34			Not connected
35			Not connected
36	SELIN–	Computer	Must be low or disconnected

RS-232-C Serial Interface

The serial interface conforms to the Electronics Industries Association (EIA) RS-232-C standard for serial communications. This standard describes a data transfer method between data terminal equipment (DTE) and data communications equipment (DCE). DTE refers to computers; DCE refers to modems or other data communications devices. Since the RS-232-C standard does not take printers into account, manufacturers are free to produce printers that operate as either DTE or DCE. AMT printers operate as DTE device.

The RS-232-C serial interface contains 25 lines. Only 10 lines carry signals or are grounded; the remaining 15 lines are not connected.

Voltages

Each line can carry two voltage levels: high and low. Timed high-to-low and low-to-high transitions on these lines enable the transfer of logical information. Valid RS-232-C voltage levels are as follows:

- ✓ High (+): +3 to +25 volts
- ✓ Low (-): -25 to -3 volts

Signals and Data Format

The serial interface consists of eight signal lines and two ground lines:

- ✓ Data Set Ready
- ✓ Data Carrier Detect
- ✓ Request To Send
- ✓ Clear To Send
- ✓ Transmit Data
- ✓ Receive Data
- ✓ Data Terminal Ready
- ✓ Inverted Data Terminal Ready
- ✓ Chassis and Signal Grounds

Data Set Ready

The Data Set Ready (DSR) signal indicates when DCE is turned on. If DSR is high, DCE is on; if DSR is low, DCE is off.

Data Carrier Detect

The Data Carrier Detect (DCD) signal indicates when DCE has established a link to a remove receiver. If DCD is high, DCE is linked; if DCD is low, DCE is not linked.

Request To Send

The Request To Send (RTS) signal indicates when DTE is ready to send data. If RTS is high, DTE is ready to send data; if RTS is low, DTE is not ready.

Clear To Send

The Clear To Send (CTS) signal indicates when DCE is ready to receive data. If CTS is high, DCE is ready to receive data; if CTS is low, DCE is not ready.

Transmit/Receive Data

The exchange of data between DTE and DCE occurs on two lines: Transmit Data (TxD) and Receive Data (RxD). DTE transmits data on the TxD line and receives data on the RxD line. Conversely, DCE transmits data on the RxD line and receives data on the TxD line.

Data signals on the TxD and RxD lines must conform to a standard serial data format, consisting of one start bit, seven or eight data bits, an optional parity bit, and at least one stop bit. Figure C-3 shows the data format.

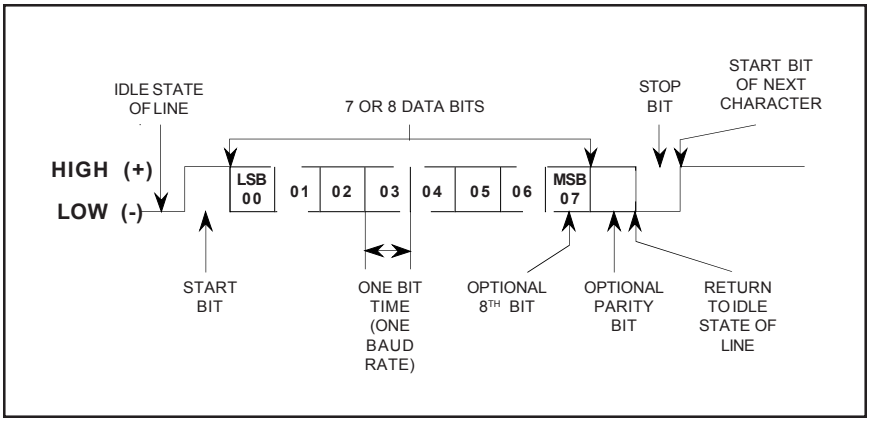


Figure C-3. Serial Data Format

Data Terminal Ready

The Data Terminal Ready (DTR) signal indicates when DTE must stop sending data and when it should continue. This stopping and starting (called handshaking) is necessary to prevent DCE's input buffer from overflowing. If DTR is high, DTE may send data; if DTR is low, DTE must pause.

Inverted Data Terminal Ready

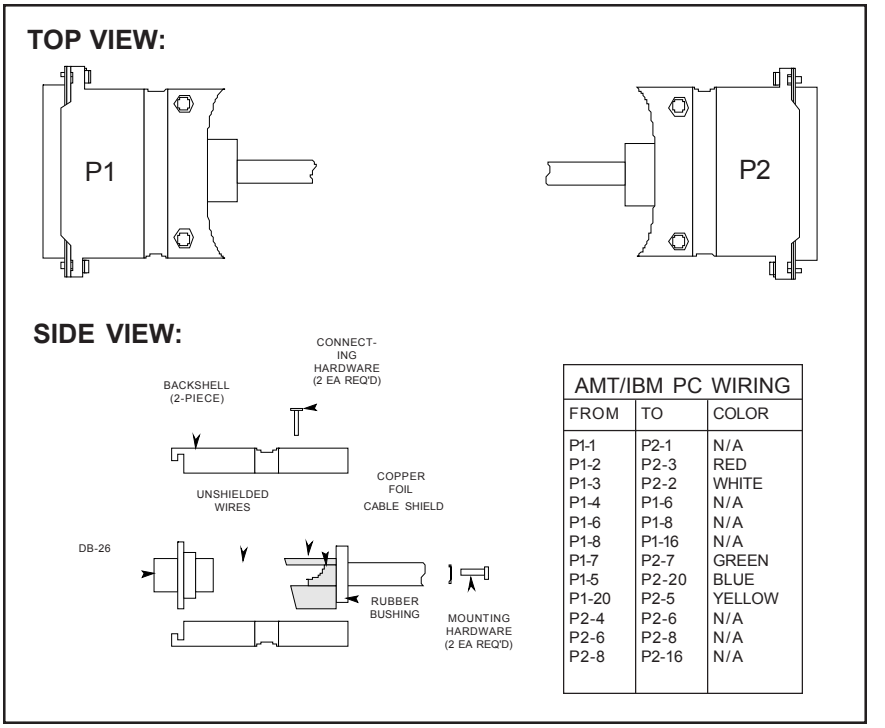
The Inverted Data Terminal Ready (DTR–) signal is the same as DTR, except the polarity of the signal is reversed.

Chassis and Signal Grounds

Chassis Ground (CGND) and Signal Ground (SGND) provide the necessary grounding.

Cable/Connector Requirements

The serial connecter must have a 25-pin male plug (Amphenol 177-RRB-25P D-SUB or equivalent). The backshell must be metal (Amphenol 17-1630-25 or equivalent). The cable must be shielded with twisted pair leads (Beldon 9505 or equivalent). The serial cable must not exceed 50 feet (15.25 meters). Figure C-4 shows a typical serial cable assembly.



AMT/IBM PC WIRING

FROM	TO	COLOR
P1-1	P2-1	N/A
P1-2	P2-3	RED
P1-3	P2-2	WHITE
P1-4	P1-6	N/A
P1-6	P1-8	N/A
P1-8	P1-16	N/A
P1-7	P2-7	GREEN
P1-5	P2-20	BLUE
P1-20	P2-5	YELLOW
P2-4	P2-6	N/A
P2-6	P2-8	N/A
P2-8	P2-16	N/A

Figure C-4. Serial Cable Assembly

Setting Serial Parameters

For successful serial communications, the computer and the printer must use identical communications parameters. These parameters consist of baud rate, parity, data bits, stop bits and handshake protocol. You set these parameters—BAUD, PARITY, DATA BITS, STOP BITS and HNDSHK—on the printer's Setup menu. For more information on these parameters, refer to the *Control Panel* section of this guide.

Handshaking Methods

The printer supports three handshaking methods:

- ✓ *DTR:* The DTR lines in the serial interface provide the DTR handshake. To pause data transfer, the printer sets DTR low; to resume, it sets DTR high.

- ✓ *X-ON/X-OFF:* The printer sends an X-OFF code on its data transmission line to pause data transfer, and an X-ON code to resume. An X-OFF is an ASCII DC3 code (19 decimal, 13 hex); an X-ON is an ASCII DC1 code (17 decimal, 11 hex). When you turn on or reset the printer, it sends an X-ON to enable data transfer.
- ✓ *ENQ/ACK:* The computer sends an ENQ code on its data transmission line to ask the printer if it can receive data. When the printer is ready, it returns an ACK code on its data transmission line. An ENQ is an ASCII ENQ code (5 decimal, 05 hex); an ACK is an ASCII ACK code (6 decimal, 6 hex). When you turn on or reset the printer, it sends an ACK to enable data transfer.

You specify which handshaking method to use at the HNDSHK parameter on the Setup menu. Refer to the *Control Panel* section of this guide for further information.

Pin Assignments

Table C-2 lists the connector pin assignments and signal requirements for the printer's serial interface.

Table C-2. Serial Pin Assignments

Pin	*Signal*	*Source*	*Printer Usage*
1	CGND		Chassis ground
2	TxD	Printer	Transmits data to computer
3	RxD	Computer	Receives data from computer
4	RTS	Printer	Remains high at all times
5	CTS	Computer	Must be high or disconnected
6	DSR	Computer	Must be high or disconnected
7	SGND		Signal ground

Table C-2. Serial Pin Assignments—continued

Pin	*Signal*	*Source*	*Printer Usage*
8	DCD	Computer	Ignored
9 - 10			Not connected
11	DTR	Printer	Same as signal on pin 20, except polarity of signal is user-selectable (signal present only when JP1 jumper on logic board is on pins 2 and 3)
12 - 19			Not connected
20	DTR	Printer	Goes low when printer buffer is almost full; returns high when buffer can hold more data (when DTR handshake is turned off, this signal remains high at all times)
21 - 24			Not connected
25	DTR–	Printer	Same as signal on pin 20, except polarity of signal is user-selectable (signal present only when JP1 jumper on logic board is on pins 1 and 3)

Appendix

D

Code Sets

This appendix lists the code sets for the following printer emulations:

- ✓ AMT Datasouth
- ✓ Diablo 630
- ✓ Epson JX
- ✓ Epson LQ-2550
- ✓ IBM Proprinter XL24
- ✓ Bar Code

Code sets include all of the *character codes*, *control codes* and *escape sequences* that you can send from your computer to the printer to control printing operations. The code sets are shown to document the completeness of the emulations, assist programmers who want to send codes to the printer, and help you decipher hexadecimal printouts. This appendix also includes an ASCII code table.

AMT Datasouth and Diablo 630 Code Set

The first part of this appendix describes the *AMT Datasouth Datasouth* and *Diablo 630* code set. The printer responds to this code set when either of these emulations is active.

Character Codes

Most of the 256 8-bit codes that a computer can send to the printer are assigned a printable character (see table D-1). When the printer receives a character code, it prints the assigned character at the current print position and moves the current print position one character space to the right.

Codes 0 to 32 and 128 to 159 decimal are assigned control functions that override the printable characters. These codes are called *control codes*. To print the characters assigned to control codes, it is necessary to use a special code sequence that tells the printer to ignore control functions and print the assigned characters.

One code that is assigned a control function is especially important to the printer—code 27 decimal—which is the ASCII ESCape code. This code tells the printer that an *escape sequence* is beginning. An escape sequence is a series of codes that performs a specific printer function. When a code is sent as part of an escape sequence, the assigned character doesn't print.

Printing Characters Assigned to Control Codes

Although there are several control codes and escape sequences in the code set that enable the printing of characters assigned to control codes, the GS control code is recommended. The GS control code enables the printing of the character assigned to any code. Just send a GS code and then the desired character code. The ESC Y sequence prints the character assigned to the SP control code and ESC Z prints the character assigned to the DEL control code.

These codes and sequences are described later in this appendix.

Character code assignments (in decimal)

Table D-1. AMT Datasouth and Diablo 630 Control Codes

NUL 0	▶ 16	SP ¢ 32	0 48	@ 64	P 80	` 96	p 112	NUL Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▒ 177	┴ 193	╤ 209	ß 225	± 241
☻ 2	↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
♥ 3	‼ 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	∑ 228	⌠ 244
ENQ ♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	ENQ à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
BEL ● 7	↨ 23	' 39	7 55	G 71	W 87	g 103	w 119	BEL ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
BS ◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	BS ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
HT ○ 9	EM ↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	HT ë 137	EM Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
LF ◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	LF è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
VT ♂ 11	ESC ← 27	+ 43	; 59	K 75	[91	k 107	{ 123	VT ï 139	ESC ¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251
FF ♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	| 124	FF î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
CR ♪ 13	GS ↔ 29	- 45	= 61	M 77	] 93	m 109	} 125	CR ì 141	GS ¥ 157	¡ 173	╜ 189	═ 205	▌ 221	∅ 237	² 253
SO ♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	SO Ä 142	₧ 158	« 174	╛ 190	╬ 206	▐ 222	ε 238	■ 254
SI ☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	¬ 127	SI Å 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	□ 255

☞**Notes:** Shading designates control codes. The SETS parameter on the Setup menu determines the actual characters that print for codes 128 to 255.

The ESC @ G escape sequence causes the printer to replace some of the standard ASCII characters with alternate characters that are used in a specific language. This sequence and the character replacements are described later in this appendix.

Control Codes and Escape Sequences

When you select *AMT Datasouth* Datasouth or *Diab630* as the active printer emulation, you can use the control codes and escape sequences listed in tables D-2 and D-3. The codes and sequences are organized into the following categories:

- ✓ Control codes
- ✓ Basic functions
- ✓ Horizontal spacing
- ✓ Vertical spacing
- ✓ Margins, tabs and page formatting
- ✓ Absolute and relative moving
- ✓ Text functions
- ✓ Graphic functions
- ✓ Miscellaneous functions

An italicized letter in an escape sequence, such as *n*, is a single-byte variable that you define. An italicized word, such as *data*, is a multi-byte variable. An underline value, such as 0 or 1, is a binary number.

Table D-2. AMT Datasouth and Diablo 630 Control Codes

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Ignore	NUL	00 or 80	0 or 128	The printer ignores this code unless it is used within an escape sequence.
Continue printing?	ENQ	05 or 85	5 or 133	With the ENQ/ACK serial handshake in use, this code causes the printer to return an ACK control code when it can receive more data.
Bell	BEL	07 or 87	7 or 135	This code sounds the audible alarm for a brief period.
Backspace	BS	08 or 88	8 or 136	This code moves the current print position one character space to the left. If the current print position is the left-most, the printer ignores this code.
Horizontal tab	HT	09 or 89	9 or 137	This code moves the current print position right to the next horizontal tab stop on the current line. If no tab stop is set to the right of the current print position, the printer ignores this code. If the factory defaults are in effect, tab stops are set every eight print positions across the page.
Line feed	LF	0A or 8A	10 or 138	This code advances the paper one line space. If the current line position is the last printable line on the page, the printer performs a form feed instead of a line feed. If the automatic carriage return mode is active, the printer performs a car-raige return in addition to the line feed.
Vertical tab	VT	0B or 8B	11or 139	This code advances the paper to the next vertical tab stop. If no vertical tab stop is set below the current line posi-tion, the printer ignores this code.
Form feed	FF	0C or 8C	12 or 140	This code ejects a single sheet or advances pin-feed paper to the next top-of-form or top margin if one is set.
Carriage return	CR	0D or 8D	13 or 141	This code moves the current print position to the left mar-gin. If automatic line feeding is active, the printer performs a line feed in addition to the carriage return.
Shift out	SO	0E or 8E	14 or 142	This code permits the printing of characters assigned codes 1 to 6. An SI or ESC SI sequence ends this function.
Shift in	SI	0F or 8F	15 or 143	This code cancels the printing of characters assigned codes 1 to 6.
Print character with code above 127	EM	19 or 99	25 or 153	If 7-bit data is in use, this code permits the printing of a character with a code above 127 decimal. When the printer receives an EM code, it adds 128 to the next code it re-ceives and prints the resulting character. This function affects only the next code in the data stream.
Escape	ESC	1B or 9B	27 or 155	This code begins an escape sequence.
Print character assigned to control code	GS	1D or 9D	29 or 157	This code permits the printing of a character assigned to a control code. After receiving a GS code, the printer does not perform the normal control function for the next code it receives, but instead prints the assigned character. This function affects only the next code in the data stream.
Space	SP	20	32	This code moves the current print position one character space to the right.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
		Basic Functions		
Reset printer	ESC SUB I	1B 1A 49	27 26 73	These sequences set the top-of-form at the current print line and reset the print modes, page setup parameters, tabs and special modes to the Setup menu defaults. These sequences do not affect the current emulation or communications parameters.
Alternate	ESC CR P	1B 0D 50	27 13 80	
Restore printer settings	ESC @ r *n*	1B 40 72 *n*	27 64 114 *n*	This sequence restores the printer settings to the factory default settings or the settings you saved previously using the SAVE parameter on the printer's Setup menu. The SAVE parameter lets you save up to five printer setups for recall later. Each setup is assigned a unique user number from 1 to 5. ☞**Note:** Since communications settings are saved as part of the user setup, be careful not to restore a user setup that changes the active interface, unless you specifically want to do so.
Factory setup	ESC @ r 0	1B 40 72 30	27 64 114 48	
User 1 setup	ESC @ r 1	1B 40 72 31	27 64 114 49	
User 2 setup	ESC @ r 2	1B 40 72 32	27 64 114 50	
User 3 setup	ESC @ r 3	1B 40 72 33	27 64 114 51	
User 4 setup	ESC @ r 4	1B 40 72 34	27 64 114 52	
User 5 setup	ESC @ r 5	1B 40 72 35	27 64 114 53	
Set emulation	ESC @ E *n*	1B 40 45 *n*	27 64 69 *n*	This sequence selects the active emulation which determines the active code set. A partial list of sequences is shown to the left. If a sequence selects an emulation that is not in the installed Intelli-card, the printer sounds the audible alarm, displays the message EMULATION ERROR, and ignores the sequence.
AMT Datasouth	ESC @ E SOH	1B 40 45 01	27 64 69 1	
AMT Datasouth (alternate)	ESC @ E 1	1B 40 45 31	27 64 69 49	
Diablo 630	ESC @ E STX	1B 40 45 02	27 64 69 2	
Epson JX	ESC @ E EOT	1B 40 45 04	27 64 69 4	
Epson LQ-2550	ESC @ E ENQ	1B 40 45 05	27 64 69 5	
IBM XL24	ESC @ E ACK	1B 40 45 06	27 64 69 6	
Bar code	ESC @ E BS	1B 40 45 08	27 64 69 8	
Set color	ESC @ R *n*	1B 40 52 *n*	27 64 82 *n*	This sequence selects a color from a seven-color palette. If a monochrome ribbon is installed, the printer ignores this sequence.
Black	ESC @ R 1	1B 40 52 31	27 64 82 49	
Blue	ESC @ R 2	1B 40 52 32	27 64 82 50	
Red	ESC @ R 3	1B 40 52 33	27 64 82 51	
Yellow	ESC @ R 4	1B 40 52 34	27 64 82 52	
Purple	ESC @ R 5	1B 40 52 35	27 64 82 53	
Green	ESC @ R 6	1B 40 52 36	27 64 82 54	
Orange	ESC @ R 7	1B 40 52 37	27 64 82 55	

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Basic Functions—continued				
Auto carriage return	ESC @ CR *n*	1B 40 0D *n*	27 64 13 *n*	This sequence starts and ends the automatic carriage return mode, wherein the printer performs a carriage return and line feed for every line feed code it receives.
Start	ESC @ CR 1	1B 40 0D 31	27 64 13 49	
End	ESC @ CR 0	1B 40 0D 30	27 64 13 48	
Auto line feed	ESC @ LF *n*	1B 40 0A *n*	27 64 10 *n*	This sequence starts and ends the automatic line feed mode, wherein the printer performs a carriage return and line feed for every carriage return code it receives.
Start	ESC @ LF 1	1B 40 0A 31	27 64 10 49	
End	ESC @ LF 0	1B 40 0A 30	27 64 10 48	
Auto line wrap				These sequences control the automatic line wrap mode, wherein the printer performs a carriage return/line feed when printing reaches the rightmost print position on a line. The rightmost print position on a line is determined by the WIDTH setting on the printer's Setup menu. With the auto line wrap mode off, the printer truncates text and graphics that exceed the rightmost print position.
Start	ESC ?	1B 3F	27 63	
End	ESC !	1B 21	27 33	
Auto perforation skip	ESC @ FF *n*	1B 40 0C *n*	27 64 12 *n*	This sequence starts and ends the automatic perforation skip mode, wherein the printer performs a form feed whenever printing reaches one-half inch from the bottom of the page. The form feed advances the paper one-half inch beyond the next top-of-form or top margin (if one is set).
Start	ESC @ FF 1	1B 40 0C 31	27 64 12 49	
End	ESC @ FF 0	1B 40 0C 30	27 64 12 48	
Unidirectional printing	ESC @ U *n*	1B 40 55 *n*	27 64 85 *n*	This sequence starts and ends unidirectional printing, wherein printing occurs only while the carriage moves from left-to-right. Unidirectional printing enables the exact alignment of multi-line graphics, component characters and other applications where vertical alignment is crucial.
Start	ESC @ U 1	1B 40 55 31	27 64 85 49	
Start (alternate)	ESC \	1B 5C	27 92	
End	ESC @ U 0	1B 40 55 30	27 64 85 48	
End (alternate)	ESC /	1B 2F	27 47	
Ignore codes	ESC @ I *n*	1B 40 49 *n*	27 64 73 *n*	This sequence causes the printer to ignore from 1 to 95 subsequent codes that it receives. The value of *n* minus 32 defines the number of codes to ignore. For example, to ignore the next 20 codes, the correct escape sequence is ESC @ I 4.
Restore control code functions	ESC SI	1B 0F	27 15	This sequence cancels the printing of characters with codes 1 to 6 that was enabled by an SO control code.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Horizontal Spacing				
Set character spacing	ESC US *n*	1B 1F *n*	27 31 *n*	This sequence sets the distance that the carriage moves after printing a character or when spacing. The value of variable *n* minus one defines a number of 1/120-inch increments to move: Character spacing = (*n* - 1) x 1/120-inch
5 characters/inch	ESC US EM	1B 1F 19	27 31 25	
6 characters/inch	ESC US NAK	1B 1F 15	27 31 21	
6.6 characters/inch	ESC US DC3	1B 1F 13	27 31 19	
7.5 characters/inch	ESC US DC1	1B 1F 11	27 31 17	
8.5 characters/inch	ESC US SI	1B 1F 0F	27 31 15	
10 characters/inch	ESC US CR	1B 1F 0D	27 31 13	
12 characters/inch	ESC US VT	1B 1F 0B	27 31 11	
13.3 characters/inch	ESC US LF	1B 1F 0A	27 31 10	
15 characters/inch	ESC US HT	1B 1F 09	27 31 9	
17.1 characters/inch	ESC US BS	1B 1F 08	27 31 8	
20 characters/inch	ESC US BEL	1B 1F 07	27 31 7	
Set character spacing to default	ESC S	1B 53	27 83	This sequence sets character spacing to the default spacing of the active font. Each font has a default character spacing that the printer uses when no character spacing is set. Courier is 10 characters per inch (cpi); Letter Gothic and Elite are 12 cpi; Times Roman is proportional; and so on. With double-wide printing on, this sequence sets character spacing to two times the default character spacing of the active font. If the active font is proportional, this sequence turns on the proportional mode.
Set character cell width	ESC @ Z *n*	1B 40 5A *n*	27 64 90 *n*	This sequence sets the width of character cells. Normally, if you print a font at a character spacing other than the default spacing, the characters overlap or are spaced too far apart. This sequence automatically proportions characters so that they print correctly at other valid character spacings. The value of variable *n* minus 32 determines the width, in 1/120-inch increments, for each character cell. If the active font is proportional, variable *n* determines the width of a space (SP); all other character cells adjust proportionally. This sequence does not change the current character spacing. To print a font at a nonstandard pitch, include this escape secquence *between* the *Set Font* and *Set Character Spacing* sequences.
5 characters/inch	ESC @ Z 8	1B 40 5A 38	27 64 90 56	
6 characters/inch	ESC @ Z 4	1B 40 5A 34	27 64 90 52	
6.6 characters/inch	ESC @ Z 2	1B 40 5A 32	27 64 90 50	
7.5 characters/inch	ESC @ Z 0	1B 40 5A 30	27 64 90 48	
8.5 characters/inch	ESC @ Z .	1B 40 5A 2E	27 64 90 46	
10 characters/inch	ESC @ Z ,	1B 40 5A 2C	27 64 90 44	
12 characters/inch	ESC @ Z *	1B 40 5A 2A	27 64 90 42	
13.3 characters/inch	ESC @ Z)	1B 40 5A 29	27 64 90 41	
15 characters/inch	ESC @ Z (	1B 40 5A 28	27 64 90 40	
17.1 characters/inch	ESC @ Z '	1B 40 5A 27	27 64 90 39	
20 characters/inch	ESC @ Z &	1B 40 5A 26	27 64 90 38	
Set horizontal spacing offset	ESC DC1 *n*	1B 11 *n*	27 17 *n*	This sequence causes an offset of 0/120-inch to 63/120-inch to be added to or subtracted from the current character spacing (or PS unit values, if the PS mode is on). Variable *n* is a byte that determines whether the offset is added or subtracted, and the distance of the offset. The printer interprets *n* as follows: ✓ Reads the value of bit 6 to determine whether the offset is positive or negative. If the bit equals 0, the offset is positive and the printer adds it; if the bits equals 1, the offset is negative and the printer subtracts it.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Horizontal Spacing—continued				
Set horizontal spacing offset ***(continued)***	ESC DC1 *n*	1B 11 *n*	27 17 *n*	✓ Reads the least significant six bits as a binary number to determine the distance of the offset in 1/120-inch increments. The offset remains in effect until the printer receives another *Set Horizontal Spacing Offset* sequence, a carriage return, or the *End Word Processing Modes* sequence.
Move carriage left 1/120 inch	ESC BS	1B 08	27 08	The sequence moves the current print position 1/120 inch to the left.
Vertical Spacing				
Set line spacing in 1/48-inch increments	ESC RS *n*	1B 1E *n*	27 30 *n*	This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The value of variable *n* minus one defines a number of 1/48-inch increments to move: Line spacing = (*n* - 1) x 1/48 inch
3 lines per inch	ESC RS DC1	1B 1E 11	27 30 17	
4 lines per inch	ESC RS CR	1B 1E 0D	27 30 13	
6 lines per inch	ESC RS HT	1B 1E 09	27 30 09	
8 lines per inch	ESC RS BEL	1B 1E 07	27 30 07	
12 lines per inch	ESC RS ENQ	1B 1E 05	27 30 05	
Set line spacing in 1/120-inch increments	ESC @ A *n*	1B 40 41 *n*	27 64 65 *n*	This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The value of variable *n* minus 32 defines a number of 1/120-inch increments to move: Line spacing = (*n* - 32) x 1/120 inch
3 lines per inch	ESC @ A H	1B 40 41 48	27 64 65 72	
4 lines per inch	ESC @ A >	1B 40 41 3E	27 64 65 62	
6 lines per inch	ESC @ A 4	1B 40 41 34	27 64 65 52	
8 lines per inch	ESC @ A /	1B 40 41 2F	27 64 65 47	
12 lines per inch	ESC @ A *	1B 40 41 2A	27 64 65 42	
Reverse line feed	ESC LF	1B 0A	27 10	This sequence reverse feeds the paper one line space so the next print line is above the previous line.
Half-line feed	ESC U	1B 55	27 85	This sequence advances the paper one-half line space.
Reverse half-line feed	ESC D	1B 44	27 68	This sequence reverse feeds the paper one-half line space.
Margins, Tabs and Page Formatting				
Set left margin	ESC 9	1B 39	27 57	This sequence sets the left margin at the current print position. All subsequent carriage returns cause the carriage to move to this location. The physical position of the left margin position on the page is unaffected by subsequent changes to character spacing. It is possible to move the carriage left of the left margin by using absolute or relative moves, backspacing, or spacing in the backward print mode.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Margins, Tabs and Page Formatting—continued				
Set right margin	ESC 0	1B 30	27 48	This sequence sets the right margin at the current print position for use by the automatic center and justify modes. The right margin setting is a soft margin that does not affect normal printing or cause automatic line wrapping. The right margin is a function of character spacing. Therefore, when character spacing changes, the right margin remains at the same print position, but not at the same place on the page.
Set top margin	ESC T	1B 54	27 84	This sequence sets the top margin at the current line posi-tion. The printer advances each new page to this position before printing begins. It is possible to access the area above the top margin using absolute or relative moves, or reverse line feeds. The top margin clears when the printer receives a *Clear Top and Bottom Margins* sequence, *Set Lines Per Page* sequence, or the operator sets a new page length from the control panel. The physical location of the top margin on the page is unaffected by subsequent changes to line spacing.
Set bottom margin	ESC L	1B 4C	27 76	This sequence sets the bottom margin at the current line position. After printing on this line, the printer feeds a new sheet; no printing can occur below the bottom margin. The bottom margin clears when the printer receives a *Clear Top and Bottom Margins* sequence, *Set Lines Per Page* sequence, or the operator sets a new page length from the control panel. The physical location of the bottom margin on the page is unaffected by subsequent changes to line spacing.
Clear top/bottom margins	ESC C	1B 43	27 67	This sequence clears the top and bottom margin settings so that printing can occur on any line on the page.
Clear all tab stops	ESC 2	1B 32	27 50	This sequence clears all previously set horizontal and vertical tab stops.
Set single horizontal tab stop	ESC 1	1B 31	27 49	This sequence sets a horizontal tab stop at the current print position. Tab stops can be set at any of the first 159 print positions on a line. Horizontal tab stops are a function of the current character spacing. Therefore, when character spacing changes, horizontal tabs remain at the same print positions, but not at the same places on the page. If the factory defaults are in effect, horizontal tab stops are set every eight print positions across the page.
Clear single horizontal tab stop	ESC 8	1B 38	27 56	This sequence clears the horizontal tab stop at the current print position.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Margins, Tabs and Page Formatting—continued				
Set vertical tab stop	ESC -	1B 2D	27 45	This sequence sets a vertical tab stop at the current line position. Vertical tab stops are a function of the current line spacing. Therefore, when line spacing changes, vertical tabs remain at the same line positions, but not at the same places on the page.
Set lines per page	ESC FF *n*	1B 0C *n*	27 12 *n*	This sequence sets the number of lines per page and sets the top-of-form at the current print position. The value of variable *n* (0 to 182) determines the number of lines per page. Variable *n* should equal the actual form length in inches divided by the current line spacing. For example, if the form length is 11 inches and the line spacing is 1/6 inch, 11 divided by 1/6 is 66—so *n* should equal 66 decimal (ASCII B, 42 hex). The number of lines per page is unaffected by subsequent changes to line spacing.
Absolute and Relative Moving				
Absolute move to print position	ESC HT *n*	1B 09 *n*	27 9 *n*	This sequence moves the current print position left or right to a specific print position (0 to 255) on the current line. The value of variable *n* minus one defines the print position to move to. For example, to move to print position 5, the sequence is ESC HT ACK. Print position 0 is the far left print column. If the sequence defines a print position beyond the rightmost print position, the printer ignores this sequence.
Absolute move to print line	ESC VT *n*	1B 0B *n*	27 11 *n*	This sequence moves paper up or down to a specific print line (0 to 182) on the page. The value of variable *n* minus one defines the line to move to. For example, to move to line 5, the sequence is ESC VT ACK. Print line 0 is the top-of-form. If the sequence specifies a line below the last line of the page, the printer ignores this sequence.
Relative move right or left	ESC @ h *n1 n2*	1B 40 68 *n1 n2*	27 64 104 *n1 n2*	This sequence moves the carriage a specific distance to the right or left from the current print position. The values of variables *n1* and *n2* define the distance in 1/240-inch increments: Distance in 1/240ths = (*n2* x 256) + *n1* To move the carriage to the right, just compute the number of increments to move and supply the correct *n1* and *n2* values. For example, to move the carriage two inches to the right (480 x 1/240"), the correct *n2* value is 1 and the correct *n1* value is 224 (480 = (1 x 256) + 224).

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Absolute and Relative Moving—continued				
Relative move right or left *(continued)*	ESC @ h *n1 n2*	1B 40 68 *n1 n2*	27 64 104 *n1 n2*	To move the carriage to the left, subtract the number of increments to move from 65,536 and then supply the correct *n1* and *n2* values. For example, to move the carriage two inches to the left (480 x 1/240"), first subtract 480 from 65,536 to get 65,056. Then, use the equation to determine the correct *n1* and *n2* values. In this example, the correct *n2* value is 254 and the correct *n1* value is 32 (65,056 = (254 x 256) + 32). If the sequence specifies a distance that would move the carriage beyond the left or right print boundary, the carriage moves to that boundary.
Relative move down or up	ESC @ v *n1 n2*	1B 40 76 *n1 n2*	27 64 118 *n1 n2*	This sequence advances or reverse feeds the paper a specific distance from the current position. The values of variables *n1* and *n2* define the distance in 1/240-inch increments: Distance in 1/240ths = (*n2* x 256) + *n1* To advance the paper, just compute the number of incre-ments to advance and supply the correct *n1* and *n2* values. For example, to advance the paper one inch (240 x 1/240"), the correct *n2* value is 0 and the correct *n1* value is 240 (240 = (0 x 256) + 240). To reverse feed the paper, subtract the number of increments to move from 65,536 and then supply the correct *n1* and *n2* values. For example, to reverse feed the paper two inches (480 x 1/240"), first subtract 480 from 65,536 to get 65,056. Then, use the equation to determine the correct *n1* and *n2* values. In this example, the correct *n2* value is 254 and the correct *n1* value is 32 (65,056 = (254 x 256) + 32).
Text Functions				
Set print quality (speed) Letter Memo Draft	ESC @ P *n* ESC @ P L ESC @ P M ESC @ P D	1B 40 50 *n* 1B 40 50 4C 1B 40 50 4D 1B 40 50 44	27 64 80 *n* 27 64 80 76 27 64 80 77 27 64 80 68	This sequence selects the text quality. Letter-quality characters are formed from a 32-dot-high by 36-dot-wide matrix. Memo-quality characters are formed from a 16-dot-high by 36-dot-wide matrix. Draft-quality characters are formed from an 8-dot-high by 15-dot-wide matrix. ☞**Note:** Some font options do not contain character sets for all print qualities. If letter-quality is selected, but the font does not contain this character set, memo-quality is selected; and vice-versa. If the font contains neither a letter- or memo-quality character set, the letter- or memo-quality Courier character set is selected, If draft-quality is selected, but the font does not contain this character set, the draft-quality Courier character set is selected.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Text Functions—continued				
Set font	ESC @ F *n*	1B 40 46 *n*	27 64 70 *n*	This sequence selects any available font; it does *not* change the current character spacing. Each font is assigned one or more numbers. To select a font, the sequence must specify one of the assigned numbers. The list of sequences to the left is only a partial list of font selections. When the printer receives a sequence that selects a font that is not in the installed Intelli-card, it sounds the audible alarm, displays the message FONT UNAVAILABLE on the control panel, and continues printing.
Courier	ESC @ F SOH	1B 40 46 01	27 64 70 1	
Courier (alternate)	ESC @ F 1	1B 40 46 31	27 64 70 49	
Gothic, 12 cpi	ESC @ F STX	1B 40 46 02	27 64 70 2	
Gothic, 12 cpi (alternate)	ESC @ F 2	1B 40 46 32	27 64 70 50	
Gothic, 17.1 cpi	ESC @ F ETX	1B 40 46 03	27 64 70 3	
Gothic, 17.1 cpi (alt.)	ESC @ F 3	1B 40 46 33	27 64 70 51	
Times Roman	ESC @ F EOT	1B 40 46 04	27 64 70 4	
Times Roman (alternate)	ESC @ F 4	1B 40 46 34	27 64 70 52	
Elite	ESC @ F ENQ	1B 40 46 05	27 64 70 5	
Orator	ESC @ F BEL	1B 40 46 07	27 64 70 7	
Courier Legal	ESC @ F HT	1B 40 46 09	27 64 70 9	
Broadway	ESC @ F FS	1B 40 46 1C	27 64 70 28	
Micro	ESC @ F RS	1B 40 46 1E	27 64 70 30	
Script	ESC @ F NAK	1B 40 46 15	27 64 70 21	
Gothic PS	ESC @ F ACK	1B 40 46 06	27 64 70 6	
Micro PS	ESC @ F '	1B 40 46 27	27 64 70 39	
OCR-A	ESC @ F SP	1B 40 46 20	27 64 70 32	
OCR-B	ESC @ F ETB	1B 40 46 17	27 64 70 23	
APL	ESC @ F EM	1B 40 46 19	27 64 70 25	
General Scientific	ESC @ F LF	1B 40 46 0A	27 64 70 10	
DEC Scientific	ESC @ F VT	1B 40 46 0B	27 64 70 11	
Chemical	ESC @ F CAN	1B 40 46 18	27 64 70 24	
Print character assigned to code 20 hex	ESC Y	1B 59	27 89	This sequence prints the character assigned to code 20 hex, which the printer normally interprets as a space.
Print character assigned to code 7F hex	ESC Z	1B 5A	27 90	This sequence prints the character assigned to code 7F hex, which the printer normally ignores.
Start print suppression	ESC 7	1B 37	27 55	This sequence starts the print supression mode, wherein the printer replaces all printable characters with spaces. A carriage return ends the print suppression mode.
Set language	ESC @ G *n*	1B 40 47 *n*	27 64 71 *n*	This sequence selects a language for the printer to use while printing text. The language settings causes the printer to replace some of the standard characters with alternate characters that are used in a specific language. The character replacements are shown in the *Control Panel* section of this guide, under the *Set Language* heading. ☞**Note:** This sequence applies only to fonts with international characters.
English (US)	ESC @ G NUL	1B 40 47 00	27 64 71 0	
French	ESC @ G SOH	1B 40 47 01	27 64 71 1	
German	ESC @ G STX	1B 40 47 02	27 64 71 2	
English (UK)	ESC @ G ETX	1B 40 47 03	27 64 71 3	
Danish I	ESC @ G EOT	1B 40 47 04	27 64 71 4	
Swedish	ESC @ G ENQ	1B 40 47 05	27 64 71 5	
Italian	ESC @ G ACK	1B 40 47 06	27 64 71 6	
Spanish I	ESC @ G BEL	1B 40 47 07	27 64 71 7	
Japanese	ESC @ G BS	1B 40 47 08	27 64 71 8	
Norwegian	ESC @ G HT	1B 40 47 09	27 64 71 9	
Danish II	ESC @ G LF	1B 40 47 0A	27 64 71 10	
Spanish II	ESC @ G VT	1B 40 47 0B	27 64 71 11	
Portuguese	ESC @ G FF	1B 40 47 0C	27 64 71 12	

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Text Functions—continued				
Backward printing				These sequences control backward printing, wherein the printer reverses the direction of normal spacing, back spacing, and character escapement. A space moves the current print position one space to the left, a backspace moves the current print position to the right, and character escapement is to the left. Backward printing does not affect horizontal tabbing, absolute and relative moves, carriage returns, and paper movement functions. A carriage return or *End Backward Printing* sequence ends backward printing.
Start	ESC 6	1B 36	27 54	
End	ESC 5	1B 35	27 53	
Bold / shadow printing				These sequences start and end bold or shadow printing at the current print position. For bold and shadow printing, the printer makes a second printing pass over the line. For bold, the printer prints each character twice at the character's normal print position. For shadow, the printer prints each character twice—once at the character's normal print position, and once 1/120-inch to the right of this position. The printer ends bold or shadow printing when it receives a carriage return, *End Bold/Shadow Printing* sequence, or *End Word Processing Modes* sequence.
Start bold	ESC O	1B 4F	27 79	
Start shadow	ESC W	1B 57	27 87	
End bold / shadow	ESC &	1B 26	27 38	
Auto underscoring				These sequences start and end underscored printing at the current print position. During underscored printing, the printer remembers the current print position as the start location. When printing reaches the end location, the printer underscores the area between the start location and the end location. The end location is the print position when the printer receives an *End Auto Underscore* or *End Word Processing Modes* sequence, a carriage return, or any paper movement code or sequence. If the end location is before the start location on the line, no underscoring occurs.
Start	ESC E	1B 45	27 69	
End	ESC R	1B 52	27 82	
End word processing modes	ESC X	1B 58	27 88	This sequence ends the program mode, bold printing, shadow printing, and automatic underscoring. The sequence also cancels the automatic center mode.
Slant printing (italics)	ESC @ S *n*	1B 40 53 *n*	27 64 83 *n*	This sequence starts and ends slant printing, wherein characters slant forward to simulate italics.
Start	ESC @ S 1	1B 40 53 31	27 64 83 49	
Start (alternate)	ESC @ S 2	1B 40 53 32	27 64 83 50	
Start (alternate)	ESC @ S 3	1B 40 53 33	27 64 83 51	
End	ESC @ S 0	1B 40 53 30	27 64 83 48	
Super / subscripting	ESC @ V *n*	1B 40 56 *n*	27 64 86 *n*	This sequence starts and ends automatic superscripting and subscripting of characters. Both superscript and subscript characters are half the normal height. Superscript characters print above the normal print line; subscript characters print below the normal print line.
Start subscripting	ESC @ V 1	1B 40 56 31	27 64 86 49	
Start superscripting	ESC @ V 2	1B 40 56 32	27 64 86 50	
End	ESC @ V 0	1B 40 56 30	27 64 86 48	

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Text Functions—continued				
Double-high printing	ESC @ H *n*	1B 40 48 *n*	27 64 72 *n*	This sequence starts and ends double-high printing, where-
Start	ESC @ H 1	1B 40 48 31	27 64 72 49	in characters print twice their normal height. This sequence
End	ESC @ H 0	1B 40 48 30	27 64 72 48	does *not* change the current line spacing.
Double-wide printing	ESC @ W *n*	1B 40 57 *n*	27 64 87 *n*	This sequence starts and ends double-wide printing, where-
Start	ESC @ W 1	1B 40 57 31	27 64 87 49	in characters print twice their normal width. This sequence
End	ESC @ W 0	1B 40 57 30	27 64 87 48	does *not* change the current character spacing.
Start auto center mode	ESC =	1B 3D	27 61	This sequence starts the automatic center mode, wherein the printer stores all subsequent data in a special buffer. When the printer receives a carriage return, line feed, or any paper movement command, it prints the stored data centered on the point that is midway between the left and right margins; then the automatic center mode ends. Automatic centering allows the line to extend beyond the left and right margins. If automatic justify is on when auto-matic centering starts, automatic centering takes precedence on the current line only. If the printer receives an *End Word Processing Modes* sequence while automatic center-ing is on, automatic centering turns off and the stored data prints normally.
Start auto justify mode	ESC M	1B 4D	27 77	This sequence starts the automatic justify mode, wherein the printer stores all subsequent data in a special buffer. When the printer receives a carriage return, line feed, or any paper movement command, it prints the stored data justified between the left and right margins. This sequence should precede the first printable character on the line to be justified. The printer begins its justify calculations from the position of the first printable character after the carriage return, line feed, horizontal tab or this sequence. This allows unjustified leading spaces or tabs, and partial-line justification. The printer calculates the number of 1/120-inch offsets needed to fill out or condense a line so that it fits perfectly between the first printable character and the right margin. If the line must expand to more than twice its original length or condense so that characters touch, the line prints unjustified. The printer applies the offset value to word spaces and then to word and character spaces. When the printer receives an *End Word Processing Modes* sequence, the automatic justify mode ends and any text in the buffer prints normally.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Text Functions—continued				
Proportional mode Start ..... End	 ESC P ESC Q	 1B 50 1B 51	 27 80 27 81	These sequences start and end the proportional mode, wherin the printer spaces characters by moving a specific number of PS units (1/120-inch increments), printing the character, and then moving by the same number of PS units again. If the active font is a PS font, the printer uses the PS unit values prestored in the font. If the active font is a fixed-pitch font, the printer uses one-half the normal character spacing as the number of PS units for every character. PS fonts contain prestored PS unit values for characters. A PS unit value represents one-half the space, in multiples of 1/120-inch, that is required to print and space a character. PS unit values range from 2 to 8. For example, the letter "V" has a PS unit value of 6, so it prints centered within a space of 12/120-inch (move 6 PS units, print the "V", and then move 6 PS units again). Or, the letter "i" has a PS unit value of 3, so it prints centered within a space of 6/120-inch (move 3 PS units, print the "i", and then move 3 PS units again). To determine the total distance from the center line of one character to the center line of the next character, just add the two characters' PS unit values. In the example above, the distance between the center of the "V" and the center of the "i" is 9/120-inch. All numeric characters (0 to 9) have the same PS unit value. This allows numeric data to be printed aligned in columnar form without having to turn off proportional spacing. During fixed-pitch printing, the printing sequence is PRINT-MOVE, where the distance of the move is the current character spacing setting. During PS printing, the printing sequence is MOVE-PRINT-MOVE, where the distance of the move is PS units. After ending proportional mode, character spacing resets to the default character spacing of the active font. If the active font is a PS font, character spacing resets to 12 characters per inch.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Text Functions—continued				
Start program mode	ESC SO M	1B 0E 4D	27 14 77	This sequence starts the Diablo daisywheel program mode. In this mode, a character follows each printable character code to define hammer intensity and ribbon feed. If the proportional mode is on, the second character defines hammer intensity and PS units. With the program mode on and the proportional-spacing mode off, the printer accepts the additional character; however, since both hammer intensity and ribbon feed are not applicable, the printer ignores this character. With both the program and proportional-spacing modes on, the printer interprets the second character as follows: ✓ Ignores bits 4, 5, and 6 (these define hammer intensity for daisywheel printers). ✓ Reads the least significant four bits as a binary number to determine the PS unit value. For further information on proportional-spacing and PS unit values, refer to the *Proportional Mode* sequence.
Wide text printing	ESC @ t *n*	1B 40 74 *n*	27 64 116 *n*	This sequence enables and disables wide text printing. With wide text printing on, a *wide*-carriage printer can print a 16-inch line and a *narrow*-carriage printer can print an 11-inch line. When you disable wide text printing, the leftmost and rightmost print positions, margins and horizontal tabs return to their original locations. With wide text printing enabled, text prints unidirectionally; that is, text printing occurs only while the carriage moves from left-to-right across the platen. Also, print speeds are slower than normal. This sequence does not affect graphics printing. If you want to print wide graphics, you must use the *Wide Graphics* sequence. ☞**Note:** With wide text printing enabled, be sure to load paper in the printer so that it aligns with the blue line on the paper scale. This ensures that printing does not run off the left side of the page.
Enable	ESC @ t 1	1B 40 74 31	27 64 116 49	
Disable	ESC @ t 0	1B 40 74 30	27 64 116 48	

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Graphic Functions				
Diablo graphics				These sequences start and end Diablo graphics. Diablo graphics temporarily set spacing and backspacing to 1/60 inch, character spacing to 0, and line spacing to 1/48 inch. The sequence does not affect absolute and relative moves. A subsequent carriage return or the *End Diablo Graphics* sequence ends Diablo graphics.
Start	ESC 3	1B 33	27 51	
End	ESC 4	1B 34	27 52	
Print 8-wire graphics				These sequences print 8-wire graphics, wherein normal character codes no longer print characters, but instead print seven- or eight-dot-high columns of dots on the current print line. This sequence does *not* change the current line spacing. Variables *n1* and *n2* define the number of columns to print. This number equals the number of bytes in the *list*. The printer interprets *n1* and *n2* as follows: Number of columns = (128 x *n2*) + *n1* For example, to print 180 columns of dots, *n2* would be 1 and *n1* would be 52 (180 = (128 x 1) + 52). The *list* in the sequence is a series of codes that define the columns to print. The first code defines the first column, the second code defines the second column, and so on. Each bit in a code controls a specific dot in the column. The most significant bit controls the top dot, the next bit controls the second dot, and so on. If the bit is a "1", the dot prints; if the bit is a "0", the dot does not print. For example, FF hex prints all eight dots in the column, 00 hex prints no dots, 0F hex prints the lower four dots, and F0 hex prints the upper four dots. ☞**Note:** For more detailed information on these escape sequences, refer to *AMT Datasouth Technical Notes—Graphics,* available separately from AMT Datasouth.
60V x 60H dpi	ESC @ K *n1 n2 list*	1B 40 4B *n1 n2 list*	27 64 75 *n1 n2 list*	
60V x 120H dpi	ESC @ L *n1 n2 list*	1B 40 4C *n1 n2 list*	27 64 76 *n1 n2 list*	
120V x 120H dpi	ESC @ M *n1 n2 list*	1B 40 4D *n1 n2 list*	27 64 77 *n1 n2 list*	
120V x 240H dpi	ESC @ N *n1 n2 list*	1B 40 4E *n1 n2 list*	27 64 78 *n1 n2 list*	
Print 16-wire graphics				These sequences print 16-wire graphics, wherein normal character codes no longer print characters, but instead print 16-dot-high columns of dots on the current print line. This sequence does *not* change the current line spacing. Variables *n1* and *n2* define the number of columns to print. This number is one-half the number of bytes in the *list*. The printer interprets *n1* and *n2* as follows: Number of columns = (128 x *n2*) + *n1* For example, to print 360 columns of dots, *n2* would be 2 and *n1* would be 104 (360 = (128 x 2) + 104).
120V x 120H dpi	ESC @ m *n1 n2 list*	1B 40 6D *n1 n2 list*	27 64 109 *n1 n2 list*	
120V x 240H dpi	ESC @ n *n1 n2 list*	1B 40 6E *n1 n2 list*	27 64 110 *n1 n2 list*	

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Graphic Functions—continued				
Print 16-wire graphics *(continnued)*				The *list* in the sequence is a series of codes that define the columns to print. The first two codes define the first column, the second two codes define the second column, and so on. Each bit in a code controls a specific dot in the column. The most significant bit controls the top dot, the next bit controls the second dot, and so on. The most signi-ficant bit of the second code controls the ninth dot from the top, the next bit controls the tenth dot, and so on. If the bit is a "1", the dot prints; if the bit is a "0", the dot does not print. For example, FF FF hex prints all 16 dots in the column, 00 00 hex prints no dots, 00 FF hex prints the lower eight dots, and FF 00 hex prints the upper eight dots. ☞**Note:** For more detailed information on these escape sequences, refer to *AMT Datasouth Technical Notes—Graphics,* available separately from AMT Datasouth.
Print 32-wire graphics 240V x 240H dpi	ESC @ o *n1 n2 list*	1B 40 6F *n1 n2 list*	27 64 111 *n1 n2 list*	This sequence prints 32-wire graphics, wherein normal character codes no longer print characters, but instead print 32-dot-high columns of dots on the current print line. This sequence does *not* change the current line spacing. Variables *n1* and *n2* define the number of columns to print. This number is one-fourth the number of bytes in the *list*. The printer interprets *n1* and *n2* as follows: Number of columns = (128 x *n2*) + *n1* For example, to print 360 columns of dots, *n2* would be 2 and *n1* would be 104 (360 = (128 x 2) + 104). The *list* in the sequence is a series of codes that define the columns to print. The first four codes define the first column, the second four codes define the second column, and so on. Each bit in a code controls a specific dot in the column. The most significant bit of the first code controls the top dot, the next bit controls the second dot, and so on. The most significant bit of the second code controls the ninth dot from the top, the next bit controls the tenth dot, and so on. If the bit is a "1", the dot prints; if the bit is a "0", the dot does not print. For example, FF FF FF FF hex prints all 32 dots in the column, 00 00 00 00 hex prints no dots, 00 00 FF FF hex prints the lower 16 dots, and FF FF 00 00 hex prints the upper 16 dots. ☞**Note:** For more detailed information on these escape sequences, refer to *AMT Datasouth Technical Notes—Graphics,* available separately from AMT Datasouth.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Graphic Functions—continued				
Interpret next graphics column count as 16-bit integer	ESC @ 8	1B 40 38	27 64 56	This sequence causes printer logic to interpret the column count in the next AMT Datasouth graphics escape sequence as a 16-bit integer: Number of columns = (256 x *n2*) + *n1* For example, to print 360 columns of dots, *n2* would be 1 and *n1* would be 104 (360 = (256 x 1) + 104). This sequence affects *only* the next AMT Datasouth graphics escape sequence sent.
Decompress next graphics list using TIFF "Packbits" decompression	ESC @ c	1B 40 63	27 64 99	This sequence causes printer logic to decompress the graphics *list* in the next AMT Datasouth graphics escape sequence using industry-standard TIFF 4.0 "Packbits" decompression. "Packbits" decompression causes printer logic to interpret the first code in the *list* as a control code. If the value of the control code is 0 to 127 (decimal), printer logic inter-prets the codes that follow as uncompressed graphics data. The actual number of codes interpretted as uncompressed graphics data is determined by the value of the control code *plus one*. If the value of the control code is 129 to 255 (decimal), printer logic interprets the next code as a com-pressed code that should be repeated up to 128 times. The actual number of times that the code is repeated is deter-mined by subtracting the value of the control code *from 256*. If the value of the control code is 128 (decimal), printer logic disregards it. After printer logic interprets the control code and processes the required graphics data, the next code in the data stream after the affected graphics data becomes the next control code and the process repeats. This sequence affects *only* the next AMT Datasouth graphics escape sequence sent.
Printhead microshift up	ESC @ B	1B 40 42	27 64 66	This sequence moves the printhead up 0.0042 inch, which enables the printing of two-pass graphics with up to 240 dots per vertical inch. When graphics end, the printhead moves back down automatically. ☞**Note:** For more detailed information on this escape sequence, refer to *AMT Datasouth Technical Notes—Graphics,* available separately from AMT Datasouth.
Wide graphics Enable ..... Disable	 ESC @ w ESC @ s	 1B 40 77 1B 40 73	 27 64 119 27 64 115	These sequences enable and disable wide graphics printing, wherein graphics can print up to 16 inches across on *wide*-carriage printers and up to 11 inches across on *narrow*-carriage printers. Margins extend beyond the normal maxi-print positions. Text printing is unaffected by this escape sequence. To print full wide graphics, make sure the cur-rent horizontal print position is 0.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Miscellaneous Functions				
Set print gap	ESC @ g	1B 40 67	27 64 103	This sequence causes the printer to detect the forms thickness at the current print position and to reset the print gap for optimal print quality. Although the printer sets the print gap automatically each time a new form is loaded, you can use this sequence to reset the print gap at any location on the form. This is useful when printing on multi-thickness forms, such as forms with peel-off cards or labels.
Park paper	ESC @ p	1B 40 70	27 64 112	This sequence causes the printer to reverse-feed the paper to the parked position. If pin-feed paper is not loaded when the printer receives this sequence, the printer ignores the sequence.
Select paper path	ESC @ l *n*	1B 40 6C *n*	27 64 108 *n*	This sequence selects a paper path for subsequent paper feeding. If pin-feed paper is loaded when the printer receives this sequence, the printer parks the paper and then switches to the specified paper path. If a cut sheet is loaded when the printer receives this sequence, the printer ejects the cut sheet and then switches to the specified paper path. If the sequence specifies the active paper path, the printer ignores the sequence.
Top	ESC @ l NUL	1B 40 6C 00	27 64 108 0	
Rear	ESC @ l SOH	1B 40 6C 01	27 64 108 1	
Bottom	ESC @ l STX	1B 40 6C 02	27 64 108 2	
Top-mounted tractor	ESC @ l ETX	1B 40 6C 03	27 64 108 3	

Epson JX, Epson LQ-2550 and IBM XL24 Code Set

The second part of this appendix describes the *Epson* and *IBM* code set. The printer responds to this code set when an Epson or IBM emulation is active.

Character Codes

Most of the 256 8-bit codes that a computer can send to the printer are assigned a printable character (see table D-4). When the printer receives a character code, it prints the assigned character at the current print position and moves the current print position one character space to the right.

Codes 0 to 32 and 128 to 159 decimal are assigned control functions that override the printable characters. These codes are called *control codes*. To print the characters assigned to control codes, it is necessary to use a special code sequence that tells the printer to ignore control functions and print the assigned characters.

One code that is assigned a control function is especially important to the printer—code 27 decimal—which is the ASCII ESCape code. This code tells the printer that an *escape sequence* is beginning. An escape sequence is a series of codes that performs a specific printer function. When a code is sent as part of an escape sequence, the assigned character does not print.

Printing Characters Assigned to Control Codes

There are several control codes and escape sequences in the code set that enable the printing of characters assigned to control codes.

The ESC 6 and ESC 7 sequences enable and disable the characters assigned control codes from 128 to 159. The ESC ^ sequence prints the character assigned to any code—even one assigned to a control code. The ESC I sequence in the Epson JX and LQ-2550 printer emulations enables and disables some of the characters assigned control codes. The ESC \ sequence in the IBM XL24 emulation prints a series of characters while ignoring the control functions.

These sequences and others affecting character codes are described later in this appendix.

Character code assignments (in decimal)

Table D-4. Epson and IBM Character Code Assignments

NUL 0	▶ 16	SP ¢ 32	0 48	@ 64	P 80	` 96	p 112	NUL Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▓ 177	┴ 193	╤ 209	ß 225	± 241
☻ 2	DC2 ↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	DC2 Æ 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
♥ 3	‼ 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
♦ 4	DC4 ¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	DC4 ö 148	ñ 164	┤ 180	─ 196	╘ 212	∑ 228	⌠ 244
ENQ ♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	ENQ à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
BEL ● 7	↨ 23	' 39	7 55	G 71	W 87	g 103	w 119	BEL ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
BS ◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	BS ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
HT ○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	HT ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
LF ◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	LF è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
VT ♂ 11	ESC ← 27	+ 43	; 59	K 75	[91	k 107	{ 123	VT ï 139	ESC ¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251
FF ♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	| 124	FF î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
CR ♪ 13	↔ 29	- 45	= 61	M 77	] 93	m 109	} 125	CR ì 141	¥ 157	¡ 173	╜ 189	═ 205	▌ 221	∅ 237	² 253
SO ♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	SO Ä 142	₧ 158	« 174	╛ 190	╬ 206	▐ 222	ε 238	■ 254
SI ☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	¬ 127	SI Å 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	□ 255

☞**Notes:** Shading designates control codes. The SETS parameter on the Setup menu determines the actual characters that print for codes 128 to 255.

Printing International Characters

The ESC ESC G and ESC R sequences in the code set cause the printer to replace some of the standard ASCII characters with alternate characters that are used in a specific language. These sequences are described later in this appendix.

Control Codes and Escape Sequences

When you select *EpsonJX, EpsonLQ* or *IBMXL24* as the active printer emulation, you can use the control codes and escape sequences listed in tables D-5 and D-6. The codes and sequences are organized into the following categories:

- ✓ Control codes
- ✓ Basic functions
- ✓ Horizontal spacing
- ✓ Vertical spacing
- ✓ Absolute and relative moving
- ✓ Boundaries, tabs and page formatting
- ✓ Text functions
- ✓ Graphic functions
- ✓ Miscellaneous functions

An italicized letter in an escape sequence, such as *n*, *n1* or *m,* represents a single-code variable. An italicized word, such as *list* or *coding*, represents a multiple-code variable.

Table D-5. Epson and IBM Control Codes

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Ignore	NUL	00 or 80	0 or 128	The printer ignores this code unless it is used within an escape sequence.
Continue printing?	ENQ	05 or 85	5 or 133	With the ENQ/ACK serial handshake in use, this code causes the printer to return an ACK control code when it can receive more data.
Bell	BEL	07 or 87	7 or 135	This code sounds the audible alarm for a brief period.
Backspace	BS	08 or 88	8 or 136	This code moves the current print position one character space to the left. If the current print position is the left-most, the printer ignores this code.
Horizontal tab	HT	09 or 89	9 or 137	This code moves the current print position right to the next horizontal tab stop on the current line. If no tab stop is set to the right of the current print position or the next tab stop on the line is beyond the right margin, the printer ignores the code. If the factory defaults are in effect, tab stops are set every eight print positions across the page.
Line feed	LF	0A or 8A	10 or 138	This code advances the paper one line space. If the current line position is the last printable line on the page, the printer performs a form feed instead of a line feed. If the automatic carriage return mode is on, the printer performs a carriage return in addition to the line feed.
Vertical tab	VT	0B or 8B	11 or 139	This code advances the paper to the next vertical tab stop. If no vertical tab stop is set below the current line position on the page, the printer ejects the page and advances to the first line on the next page. If no vertical tab stops are set, the printer performs a carriage return and line feed.
Form feed	FF	0C or 8C	12 or 140	This code ejects a cut sheet or advances pin-feed paper to the next top-of-form or top margin if one is set. This code also moves the current print position to the left margin.
Carriage return	CR	0D or 8D	13 or 141	This code moves the current print position to the left margin. If automatic line feeding is active, the printer performs a line feed in addition to the carriage return.
Start double-wide printing for one line	SO	0E or 8E	14 or 142	This code starts double-wide printing on the current line and doubles the character spacing to accommodate the wider characters. A DC4 code or any control code or escape sequence that causes paper movement ends double-wide printing and resumes normal character spacing. The *Start/End Double-Wide Printing* sequence also ends double-wide printing.

Table D-5. Epson and IBM Control Codes—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Start condensed printing ..	SI	0F or 8F	15 or 143	This code starts condensed printing, wherein character spacing and character cell size are 17.1 characters per inch. A DC2 code ends condensed printing.
End condensed printing	DC2	12 or 92	18 or 146	This code ends condensed printing and sets character spacing and character cell size to 10 characters per inch.
End double-wide printing on current line	DC4	14 or 94	20 or 148	This code ends double-wide printing started with an SO code and resumes normal character spacing. This code does not end double-wide printing started with escape sequences.
Escape	ESC	1B or 9B	27 or 155	This code begins an escape sequence.
Space	SP	20	32	This code moves the current print position one character space to the right.

Table D-6. Epson and IBM Escape Sequences

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
		Basic Functions		
Reset printer	ESC @	1B 40	27 64	This sequence sets the top-of-form at the current print line and resets print modes, page setup parameters, tabs and special modes to the Setup menu defaults. The sequence does not affect the current emulation or communications parameters.
Restore printer settings	ESC ESC r *n*	1B 1B 72 *n*	27 27 114 *n*	This sequence restores the printer settings to the factory default settings or to settings you saved previously using the SAVE parameter on the printer's Setup menu. The SAVE parameter lets you save up to five printer setups for recall later. Each setup is assigned a unique user number from 1 to 5. ☞**Note:** Since communications settings are saved as part of the user setup, be careful not to restore a user setup that changes the active interface, unless you specifically want to do so.
Factory setup	ESC ESC r 0	1B 1B 72 30	27 27 114 48	
User 1 setup	ESC ESC r 1	1B 1B 72 31	27 27 114 49	
User 2 setup	ESC ESC r 2	1B 1B 72 32	27 27 114 50	
User 3 setup	ESC ESC r 3	1B 1B 72 33	27 27 114 51	
User 4 setup	ESC ESC r 4	1B 1B 72 34	27 27 114 52	
User 5 setup	ESC ESC r 5	1B 1B 72 35	27 27 114 53	
Set emulation	ESC ESC E *n*	1B 1B 45 *n*	27 27 69 *n*	This sequence selects the active printer emulation which determines the active code set. At left, is a partial list of the printer emulations that this sequence can select. If a sequence selects an emulation that is not in the installed Intelli-card, the printer sounds the audible alarm, displays the message EMULATION ERROR, and ignores the sequence.
AMT	ESC ESC E SOH	1B 1B 45 01	27 27 69 1	
AMT (alternate)	ESC ESC E 1	1B 1B 45 31	27 27 69 49	
Diablo 630	ESC ESC E STX	1B 1B 45 02	27 27 69 2	
Epson JX	ESC ESC E EOT	1B 1B 45 04	27 27 69 4	
Epson LQ-2550	ESC ESC E ENQ	1B 1B 45 05	27 27 69 5	
IBM XL24	ESC ESC E ACK	1B 1B 45 06	27 27 69 6	
Bar code	ESC ESC E BS	1B 1B 45 08	27 27 69 8	
Set color				These sequences set the printing color. If a monochrome ribbon is installed, the printer ignores these sequences.
Black	ESC b	1B 62	27 98	
Black (alternate)	ESC r 0	1B 72 30	27 114 48	
Black (alternate)	ESC ESC R 1	1B 1B 52 31	27 27 82 49	
Blue	ESC c	1B 63	27 99	
Blue (alternate)	ESC r 2	1B 72 32	27 114 50	
Blue (alternate)	ESC ESC R 2	1B 1B 52 32	27 27 82 50	
Red	ESC m	1B 6D	27 109	
Red (alternate)	ESC r 1	1B 72 31	27 114 49	
Red (alternate)	ESC ESC R 3	1B 1B 52 33	27 27 82 51	
Yellow	ESC y	1B 79	27 121	
Yellow (alternate)	ESC r 4	1B 72 34	27 114 52	
Yellow (alternate)	ESC ESC R 4	1B 1B 52 34	27 27 82 52	
Purple	ESC v	1B 76	27 118	
Purple (alternate)	ESC r 3	1B 72 33	27 114 51	
Purple (alternate)	ESC ESC R 5	1B 1B 52 35	27 27 82 53	
Green	ESC h	1B 68	27 104	
Green (alternate)	ESC r 6	1B 72 36	27 114 54	
Green (alternate)	ESC ESC R 6	1B 1B 52 36	27 27 82 54	
Orange	ESC o	1B 6F	27 111	
Orange (alternate)	ESC r 5	1B 72 35	27 114 53	
Orange (alternate)	ESC ESC R 7	1B 1B 52 37	27 27 82 55	

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Basic Functions—continued				
Auto carriage return	ESC ESC CR *n*	1B 1B 0D *n*	27 27 13 *n*	This sequence starts and ends the automatic carriage return mode, wherein the printer performs a carriage return and line feed for every line feed code it receives.
Start	ESC ESC CR 1	1B 1B 0D 31	27 27 13 49	
End	ESC ESC CR 0	1B 1B 0D 30	27 27 13 48	
Auto line feed	ESC ESC LF *n*	1B 1B 0A *n*	27 27 10 *n*	These sequences start and end the automatic line feed mode, wherein the printer performs a carriage return and line feed for every carriage return code it receives.
Start (all emulations)	ESC ESC LF 1	1B 1B 0A 31	27 27 10 49	
Start (IBM emulation)	ESC 5 1	1B 35 31	27 53 49	
End (all emulations)	ESC ESC LF 0	1B 1B 0A 30	27 27 10 48	
End (IBM emulation)	ESC 5 0	1B 35 30	27 53 48	
Auto perforation skip mode 1	ESC ESC FF *n*	1B 1B 0C *n*	27 27 12 *n*	This sequence starts and ends the automatic perforation skip mode, wherein the printer performs a form feed whenever printing reaches one-half inch from the bottom of the page. The form feed advances the paper one-half inch beyond the next top-of-form or top margin (if one is set).
Start	ESC ESC FF 1	1B 1B 0C 31	27 27 12 49	
End	ESC ESC FF 0	1B 1B 0C 30	27 27 12 48	
Start auto perforation skip mode 2	ESC N *n*	1B 4E *n*	27 78 *n*	This sequence starts and ends the automatic perforation skip mode, wherein the printer performs a form feed whenever printing approaches the bottom of the page. The form feed advances the paper to the next top-of-form or top margin (if one is set). The value of variable *n* defines how many blank lines are left at the bottom of each page. Varia-ble *n* can range from one line up to the current page length. For example, to leave six blank lines at the bottom of a page, the correct sequence is ESC N ACK. The *End Auto Perforation Skip Mode 2, Set Page Length in Lines* or *Set Page Length in Inches* sequence ends this mode.
End auto perforation skip mode 2	ESC O	1B 4F	27 79	These sequence ends automatic perforation skip mode 2.
Unidirectional printing				These sequences control unidirectional printing, wherein printing occurs only while the carriage moves from left to right. Unidirectional printing enables the exact alignment of multi-line graphics, component characters and other applications where vertical alignment is important.
Start	ESC U 1	1B 55 31	27 85 49	
Start (alternate)	ESC ESC U 1	1B 1B 55 31	27 27 85 49	
End	ESC U 0	1B 55 30	27 85 48	
End (alternate)	ESC ESC U 0	1B 1B 55 30	27 27 85 48	
Ignore codes	ESC ESC I *n*	1B 1B 49 *n*	27 27 73 *n*	This sequence causes the printer to ignore from 1 to 95 subsequent codes that it receives. The value of variable *n* minus 32 defines the number of subsequent codes to ignore. For example, to ignore the next 20 codes, the correct escape sequence is ESC ESC I 4.

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Horizontal Spacing				
Set character spacing to 10 or 17.1 CPI	ESC P	1B 50	27 80	This sequence sets character spacing and character cell size to 10 characters per inch. If condensed printing is on, this sequence sets character spacing and character cell size to 17.1 chracters per inch. ☞**Note:** This sequence is not supported when the IBM XL24 emulation is active.
Set character spacing to 12 CPI	ESC M ESC :	1B 4D 1B 3A	27 77 27 58	These sequences set character spacing and character cell size to 12 characters per inch.
Set character spacing to 15 CPI	ESC g	1B 67	27 103	This sequence sets character spacing and character cell size to 15 characters per inch. Condensed printing does not affect the function of this sequence.
Start condensed printing	ESC SI	1B 0F	27 15	This sequence starts condensed printing, wherein character spacing and character cell size are 17.1 characters per inch. A DC2 code ends condensed printing.
Set character cell size	ESC ESC Z *n*	1B 1B 5A *n*	27 27 90 *n*	This sequence sets the character cell size so that characters are the correct size for the spacing. The value of variable *n* minus 32 defines a number of 1/120-inch increments to move: Character spacing = (*n* - 32) x 1/120-inch
5 characters/inch	ESC ESC Z 8	1B 1B 5A 38	27 27 90 56	
6 characters/inch	ESC ESC Z 4	1B 1B 5A 34	27 27 90 52	
6.6 characters/inch	ESC ESC Z 2	1B 1B 5A 32	27 27 90 50	
7.5 characters/inch	ESC ESC Z 0	1B 1B 5A 30	27 27 90 48	
8.5 characters/inch	ESC ESC Z .	1B 1B 5A 2E	27 27 90 46	
10 characters/inch	ESC ESC Z ,	1B 1B 5A 2C	27 27 90 44	
12 characters/inch	ESC ESC Z *	1B 1B 5A 2A	27 27 90 42	
13.3 characters/inch	ESC ESC Z)	1B 1B 5A 29	27 27 90 41	
15 characters/inch	ESC ESC Z (	1B 1B 5A 28	27 27 90 40	
17.1 characters/inch	ESC ESC Z '	1B 1B 5A 27	27 27 90 39	
20 characters/inch	ESC ESC Z &	1B 1B 5A 26	27 27 90 38	
Set intercharacter space	ESC SP *n*	1B 20 *n*	27 32 *n*	This sequence sets the amount of space for the printer to add to the right of each character in addition to the space already allowed in the design of the character. The value of variable *n* defines the number of units to add. The unit size depends on the current emulation and print quality. If the emulation is Epson JX, the unit size is always 1/120 inch, regardless of the print quality. In all other emulations, the unit size is 1/180 inch in letter- and memo-quality and 1/120 inch in draft-quality. For example, to add 1/4 inch to the right of each character while in Epson LQ-2550 emulation and letter-quality, variable *n* would be 45 decimal (1/4 inch = 45 x 1/180 inch).

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
		Vertical Spacing		
Set line spacing in 1/216- or 1/180-inch increments	ESC 3 *n*	1B 33 *n*	27 51 *n*	This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The sequence specifies the distance as a number of 1/216- or 1/180-inch increments, depending on the active emulation. When the Epson JX or IBM XL24 emulation is active, the distance is in 1/216-inch increments. When the Epson LQ-2550 emulation is active, the distance is in 1/180-inch increments. The value of variable *n* defines the line spacing distance: Line spacing = *n* x 1/216-inch (Epson JX & IBM XL24) Line spacing = *n* x 1/180-inch (Epson LQ-2550) ☞**Note:** When the IBM XL24 emulation is active, the *Set Vertical Units* sequence forces the vertical spacing unit to either 1/216 or 1/180 inch.
Epson JX & IBM XL24:				
3 lines per inch	ESC 3 H	1B 33 48	27 51 72	
4 lines per inch	ESC 3 6	1B 33 36	27 51 54	
6 lines per inch	ESC 3 $	1B 33 24	27 51 36	
8 lines per inch	ESC 3 ESC	1B 33 1B	27 51 27	
12 lines per inch	ESC 3 DC2	1B 33 12	27 51 18	
Epson LQ-2550:				
3 lines per inch	ESC 3 <	1B 33 3C	27 51 60	
4 lines per inch	ESC 3 -	1B 33 2D	27 51 45	
6 lines per inch	ESC 3 RS	1B 33 1E	27 51 30	
8 lines per inch	ESC 3 ETB	1B 33 17	27 51 23	
12 lines per inch	ESC 3 SI	1B 33 0F	27 51 15	
Set line spacing in 1/72- or 1/60-inch increments	ESC A *n*	1B 41 *n*	27 65 *n*	This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The sequence specifies the distance as a number of 1/72- or 1/60-inch increments, depending on the active emulation. When the Epson JX or IBM XL24 emulation is active, the distance is in 1/72-inch increments. When the Epson LQ-2550 emulation is active, the distance is in 1/60-inch increments. Also, when the IBM XL24 emulation is active, the printer stores but does not use the line spacing setting until it receives a *Start New Line Spacing* sequence. The value of variable *n* defines the line spacing distance: Line spacing = *n* x 1/72-inch (Epson JX & IBM XL24) Line spacing = *n* x 1/60-inch (Epson LQ-2550) ☞**Note:** When the IBM XL24 emulation is active, the *Set Vertical Units* sequence forces the vertical spacing unit to either 1/72 or 1/60 inch.
Epson JX & IBM XL24:				
3 lines per inch	ESC A CAN	1B 41 18	27 65 24	
4 lines per inch	ESC A DC2	1B 41 12	27 65 18	
6 lines per inch	ESC A FF	1B 41 0C	27 65 12	
8 lines per inch	ESC A HT	1B 41 09	27 65 9	
12 lines per inch	ESC A ACK	1B 41 06	27 65 6	
Epson LQ-2550:				
3 lines per inch	ESC A DC4	1B 41 14	27 65 20	
4 lines per inch	ESC A SI	1B 41 0F	27 65 15	
6 lines per inch	ESC A LF	1B 41 0A	27 65 10	
8 lines per inch	ESC A BS	1B 41 08	27 65 8	
12 lines per inch	ESC A ENQ	1B 41 05	27 65 5	
Set vertical units	ESC [\ EOT NUL NUL NUL NUL *n*	1B 5B 5C 04 00 00 00 00 *n*	27 91 92 4 0 0 0 0 *n*	This sequence sets the vertical distance units for the *Set Line Spacing* (ESC 3 and ESC A) sequences and the *Paper Feed* (ESC J) sequence. The value of variable *n* determines the vertical distance units. *Vertical distance units* / *Variable n* *ESC 3 ESC A ESC J* / *ASCII Hex Dec* 1/180 1/60 1/180 . . . . . B4 180 1/216 1/72 1/216 . . . . . D8 216 ☞**Note:** This sequence is not supported when an Epson emulation is active.

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Vertical Spacing—continued				
Set line spacing in 1/120-inch increments	ESC ESC A *n*	1B 1B 41 *n*	27 27 65 *n*	This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The value of variable *n* minus 32 defines a number of 1/120-inch increments to move:
3 lines per inch	ESC ESC A H	1B 1B 41 48	27 27 65 72	
4 lines per inch	ESC ESC A >	1B 1B 41 3E	27 27 65 62	
6 lines per inch	ESC ESC A 4	1B 1B 41 34	27 27 65 52	
8 lines per inch	ESC ESC A /	1B 1B 41 2F	27 27 65 47	Line spacing = (*n* - 32) x 1/120-inch
12 lines per inch	ESC ESC A *	1B 1B 41 2A	27 27 65 42	
Set line spacing in 1/360-inch increments	ESC + *n*	1B 2B *n*	27 43 *n*	This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The sequence specifies the distance as a number of 1/360-inch increments. The value of variable *n* defines the line spacing distance:
3 lines per inch	ESC + x	1B 2B 78	27 43 120	
4 lines per inch	ESC + Z	1B 2B 5A	27 43 90	
6 lines per inch	ESC + <	1B 2B 3C	27 43 60	
8 lines per inch	ESC + -	1B 2B 2D	27 43 45	
12 lines per inch	ESC + RS	1B 2B 1E	27 43 30	Line spacing = *n* x 1/360-inch
Set line spacing to 1/6"	ESC 2	1B 32	27 50	This sequence sets line spacing to 1/6 inch. ☞**Note:** This sequence is not supported when the IBM XL24 emulation is active.
Start new line spacing	ESC 2	1B 32	27 50	This sequence starts the new line spacing that was set by the *Set Line Spacing* (ESC A) sequence. If no line spacing sequence has been sent, the printer sets line spacing to 1/6 inch. ☞**Note:** This sequence is not supported when an Epson emulation is active.
Set line spacing to 1/8"	ESC 0	1B 30	27 48	This sequence sets line spacing to 1/8 inch.
Set line spacing to 7/72"	ESC 1	1B 31	27 49	This sequence sets line spacing to 7/72 inch.
Reverse line feed	ESC]	1B 5D	27 93	This sequence reverse feeds the paper one line space so the next print line is above the previous line.
Paper feed in 1/216- or 1/180-inch increments	ESC J *n*	1B 4A *n*	27 74 *n*	This sequence advances the paper a specific distance without changing the current line spacing. The sequence speci-fies the distance as a number of 1/216- or 1/180-inch incre-ments, depending on the active emulation. When the Epson JX or IBM XL24 emulation is active, the distance is in 1/216-inch increments. When the Epson LQ-2550 emulation is active, the distance is in 1/180-inch incre-ments. For example, with the Epson JX emulation active, to move the paper 18/216 inch, the correct sequence is ESC J DC2. ☞**Note:** When the IBM XL24 emulation is active, the *Set Vertical Units* sequence forces the vertical distance unit to either 1/216 or 1/180 inch.

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Absolute and Relative Moving				
Absolute move to print position	ESC $ *n1 n2*	1B 24 *n1 n2*	27 36 *n1 n2*	This sequence moves the carriage a specific distance from the left print boundary. The values of variables *n1* and *n2* define the distance in 1/60-inch increments: Distance in 1/60ths = (*n2* x 256) + *n1* For example, to move the carriage five inches to the right of the left print boundary (300/60 inch), the correct *n2* value is 1 and the correct *n1* value is 44 (300 = (1 x 256) + 44). If the sequence specifies a distance beyond the right print boundary, the printer ignores the sequence.
Relative move to print position	ESC \ *n1 n2*	1B 5C *n1 n2*	27 92 *n1 n2*	This sequence moves the carriage a specific distance left or right from the current print position. The values of variables *n1* and *n2* define the distance in 1/180-inch increments during letter- or memo-quality printing, and in 1/120-inch increments during draft-quality printing: Letter/Memo: Distance in 1/180ths = (*n2* x 256) + *n1* Draft: Distance in 1/120ths = (*n2* x 256) + *n1* ☞**Note:** When the Epson JX emulation is active, varia-bles *n1* and *n2* define a distance in 1/120-inch increments, regardless of the print quality. To move the carriage to the right, just compute the number of increments to move and supply the correct *n1* and *n2* values. For example, to move the carriage two inches to the right during letter-quality printing (360/180 inch), the correct *n2* value is 1 and the correct *n1* value is 104 (360 = (1 x 256) + 104). To move the carriage to the left, subtract the number of increments to move from 65,536 and then supply the correct *n1* and *n2* values. For example, to move the carriage two inches to the left during letter-quality printing (360/180 inch), first subtract 360 from 65,536 to get 65,176. Then, use the equation to determine the correct *n1* and *n2* values. In this example, the correct *n2* value is 254 and the correct *n1* value is 152 (65,176 = (254 x 256) + 152). If the se-quence specifies a distance that would move the carriage beyond the left or right print boundary, the printer ignores the sequence. ☞**Note:** This sequence is not supported when the IBM XL24 emulation is active.

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Absolute and Relative Moving—continued				
Relative move right ..... to print position	ESC d *n1 n2*	1B 64 *n1 n2*	27 100 *n1 n2*	This sequence moves the carriage a specific distance to the right from the current print position. The value of variables *n1* and *n2* define the distance in 1/120-inch increments: Distance in 1/120ths = (*n2* x 256) + *n1* For example, to move the carriage three inches to the right (360/120 inch), the correct *n2* value is 1 and the correct *n1* value is 104 (360 = (1 x 256) + 104). If the sequence specifies a distance that would move the carriage beyond the right print boundary, the carriage moves to that boundary.
Relative move right ..... or left	ESC ESC h *n1 n2*	1B 1B 68 *n1 n2*	27 27 104 *n1 n2*	This sequence moves the carriage a specific distance to the right or left from the current print position. The values of variables *n1* and *n2* define the distance in 1/240-inch increments: Distance in 1/240ths = (*n2* x 256) + *n1* To move the carriage to the right, just compute the number of increments to move and supply the correct *n1* and *n2* values. For example, to move the carriage two inches to the right (480 x 1/240"), the correct *n2* value is 1 and the correct *n1* value is 224 (480 = (1 x 256) + 224). To move the carriage to the left, subtract the number of increments to move from 65,536 and then supply the correct *n1* and *n2* values. For example, to move the carriage two inches to the left (480 x 1/240"), first subtract 480 from 65,536 to get 65,056. Then, use the equation to determine the correct *n1* and *n2* values. In this example, the correct *n2* value is 254 and the correct *n1* value is 32 (65,056 = (254 x 256) + 32). If the sequence specifies a distance that would move the carriage beyond the left or right print boundary, the carriage moves to that boundary.
Relative move down ..... or up	ESC ESC v *n1 n2*	1B 1B 76 *n1 n2*	27 27 118 *n1 n2*	This sequence advances or reverse feeds the paper a specific distance from the current position. The values of variables *n1* and *n2* define the distance in 1/240-inch increments: Distance in 1/240ths = (*n2* x 256) + *n1* To advance the paper, just compute the number of incre-ments to advance and supply the correct *n1* and *n2* values. For example, to advance the paper one inch (240 x 1/240"), the correct *n2* value is 0 and the correct *n1* value is 240 (240 = (0 x 256) + 240).

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Absolute and Relative Moving—continued				
Relative move down or up *(continued)*				To reverse feed the paper, subtract the number of increments to move from 65,536 and then supply the correct *n1* and *n2* values. For example, to reverse feed the paper two inches (480 x 1/240"), first subtract 480 from 65,536 to get 65,056. Then, use the equation to determine the correct *n1* and *n2* values. In this example, the correct *n2* value is 254 and the correct *n1* value is 32 (65,056 = (254 x 256) + 32).
Boundaries, Tabs and Page Formatting				
Set top-of-form (TOF)	ESC 4	1B 34	27 52	This sequence sets the top-of-form at the current line position. The printer regards the current print line as the first line on the page (line 0) and starts counting lines from that point. ☞**Note:** Most AMT ACCEL-6300 series printers *do not* support this printer command.
Set left print boundary	ESC l *n*	1B 6C *n*	27 108 *n*	This sequence cancels printing of the current line, resets the default tabs, and sets the left print boundary anywhere on the line. All subsequent horizontal move commands, such as carriage returns and tabs, are relative to the new boundary. The value of variable *n* defines where to set the left print boundary relative to the true leftmost print position and with respect to the current character spacing. For example, to set the left print boundary one inch to the right of the true leftmost print position with character spacing at 10 cpi, the correct sequence is ESC l LF. If the sequence specifies a boundary that is at or to the right of the right print boundary, the printer ignores this sequence. If you set a left print boundary with proportional-spacing selected, the printer uses 12 cpi to interpret the *n* variable.

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Boundaries, Tabs and Page Formatting—continued				
Set right print boundary	ESC Q *n*	1B 51 *n*	27 81 *n*	This sequence cancels printing of the current line, resets the default tabs, and sets the right print boundary anywhere on the page. The value of variable *n* defines where to set the right print boundary relative to the true leftmost print position and with respect to the current character spacing. For example, to set the right print boundary ten inches to the right of the true leftmost print position with character spacing at 10 cpi, the correct sequence is ESC Q d. If the sequence specifies a boundary that is at or to the left of the left print boundary, the printer ignores this sequence. If you set a right print boundary with proportional-spacing selected, the printer uses 12 cpi to interpret the *n* variable.
Set left and right print boundaries	ESC X *n1 n2*	1B 58 *n1 n2*	27 88 *n1 n2*	This sequence cancels printing of the current line, resets the default tabs, and sets the left and right print boundaries on the page. All subsequent horizontal move commands, such as carriage returns and tabs, are relative to the new left print boundary. The values of variables *n1* and *n2* define where to set the left and right print boundaries relative to the true leftmost print position and with respect to the current char-acter spacing. Variable *n1* defines the left print boundary; variable *n2* defines the right print boundary. For example, to set the left print boundary one inch from the leftmost print position and the right print boundary ten inches from the leftmost print position at 10 cpi, the correct sequence is ESC X LF d. If the sequence specifies a left print boundary that is at or to the right of the right print boundary, the printer ignores the sequence. If the sequence specifies a right print boundary that is to the right of the righmost print position, the printer sets the right print boundary at the rightmost print position. If *n1* is NUL, the printer does not change the left print boundary; or, if *n2* is NUL, the printer does not change the right print boundary. If you set print boundaries with proportional-spacing selected, the printer uses 12 cpi to interpret the *n1* and *n2* variables.

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Boundaries, Tabs and Page Formatting—continued				
Set/clear absolute horizontal tab stops	ESC D *list* NUL	1B 44 *list* 00	27 68 *list* 0	This sequence clears all current horizontal tab stops and sets new tab stops using the current character spacing. Tab stops can be set at any of the first 159 print positions on a line. Epson and IBM horizontal tabs are absolute, which means that the physical location of the tab stops on the page are unaffected by changes in character spacing. The *list* in the sequence is a series of bytes that define where to set the tab stops, and must be listed in ascending order. The last byte of the sequence must be a NUL or a code less than the last tab stop defined in the *list*. For example, to set abso-lute horizontal tab stops every inch at 10 cpi, the correct sequence is 27 68 10 20 30 40 50 60 70 80 90 100 110 120 130 0 (decimal). To clear horizontal tab stops without set-ting new ones, omit the *list* from the sequence. To set hori-zontal tab stops with proportional-spacing selected, use 12 cpi when specifying the tab stop locations. If the factory defaults are in effect, horizontal tab stops are set every eight print positions across the page. To reset horizontal tabs every eight print positions across the page, use the *Set Absolute Horizontal Tab Stops Every Eight Print Positions* sequence. ☞**Note:** This sequence is not supported when the IBM XL24 emulation is active.
Set/clear absolute vertical tab stops	ESC B *list* NUL	1B 42 *list* 00	27 66 *list* 0	This sequence clears all current vertical tab stops and sets new tab stops using the current line spacing. Epson and IBM vertical tabs are absolute, which means that the physical location of the tab stops on the page are unaffected by changes in line spacing. The *list* in the sequence is a series of bytes that define where to set the tab stops, and must be listed in ascending order. The last byte of the sequence must be a NUL or a code less than the last tab in the *list*. For example, to set absolute vertical tab stops every inch at 6 lpi, the correct sequence is 27 66 6 12 18 24 30 36 42 48 54 60 0 (decimal). To clear vertical tab stops without setting new ones, omit the *list* from the sequence.
Set absolute horizontal tab stops every eight print positions	ESC R	1B 52	27 82	This sequence clears all current horizontal and vertical tab stops and sets new horizontal tab stops at every eight print positions using the current character spacing. ☞**Note:** This sequence is not supported when an Epson emulation is active.

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Boundaries, Tabs and Page Formatting—continued				
Set page length in lines	ESC C *n*	1B 43 *n*	27 67 *n*	This sequence sets the number of lines per page and sets the top-of-form at the current line position. The value of variable *n* (0 to 182) determines the number of lines per page. Variable *n* should equal the actual form length in inches divided by the current line spacing. For example, if the current form length is 11 inches and the line spacing is 1/6 inch, 11 divided by 1/6 is 66--so *n* should equal 66 decimal. The number of lines per page is unaffected by subsequent changes to line spacing.
Set page length in inches	ESC C NUL *n*	1B 43 00 *n*	27 67 0 *n*	This sequence sets the number of inches per page and sets the top-of-form at the current line position. The value of variable *n* (1 to 30) determines the number of inches per page. For example, if the form length is 11 inches, the correct *n* value is 11 decimal.
Text Functions				
Set print quality				This sequence selects letter-, memo- or draft-quality printing. Letter-quality characters are formed from a 32-dot-high by 36-dot-wide matrix. Memo-quality characters are formed from a 16-dot-high by 36-dot-wide matrix. Draft-quality characters are formed from an 8-dot-high by 15-dot-wide matrix. ☞**Note:** Some font options do not contain character sets for all print qualities. If letter-quality is selected, but the font does not contain this character set, memo-quality is selected; and vice-versa. If the font contains neither a letter- or memo-quality character set, the letter- or memo-quality Courier character set is selected. If draft-quality is selected, but the font does not contain this character set, the draft-quality Courier character set is selected.
Letter	ESC x SOH	1B 78 01	27 120 1	
Letter (alternate)	ESC ESC P L	1B 1B 50 4C	27 27 80 76	
Memo	ESC x STX	1B 78 02	27 120 2	
Memo (alternate)	ESC ESC P M	1B 1B 50 4D	27 27 80 77	
Draft	ESC x NUL	1B 78 00	27 120 0	
Draft (alternate)	ESC ESC P D	1B 1B 50 44	27 27 80 68	
Set typestyle family	ESC k *n*	1B 6B *n*	27 107 *n*	This sequence selects the Courier, Gothic, Elite or Script font and sets character spacing and cell size to the default of the selected font. If the sequence selects a font that is not in the installed Intelli-card, the printer sounds the audible alarm, displays the message FONT UNAVAILABLE on the control panel, and continues printing.
Courier (10 cpi)	ESC k NUL	1B 6B 00	27 107 0	
Gothic (12 cpi)	ESC k SOH	1B 6B 01	27 107 1	
Courier (10 cpi)	ESC k STX	1B 6B 02	27 107 2	
Elite (12 cpi)	ESC k ETX	1B 6B 03	27 107 3	
Script (12 cpi)	ESC k EOT	1B 6B 04	27 107 4	

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Text Functions—continued				
Set font	ESC ESC F *n*	1B 1B 46 *n*	27 27 70 *n*	This sequence selects any available font; it does *not* change the current character spacing. Each font is assigned one or more numbers. To select a font, the sequence must specify one of the assigned numbers. At left is a partial list of fonts. When the printer receives a sequence that selects a font that is not in the installed Intelli-card, it sounds the audiable alarm, displays FONT UNAVAILABLE on the control panel, and continues printing.
Courier (10 cpi)	ESC ESC F SOH	1B 1B 46 01	27 27 70 1	
Courier (alternate, 10 cpi)	ESC ESC F 1	1B 1B 46 31	27 27 70 49	
Gothic (12 cpi)	ESC ESC F STX	1B 1B 46 02	27 27 70 2	
Gothic (alternate, 12 cpi)	ESC ESC F 2	1B 1B 46 32	27 27 70 50	
Gothic (17.1 cpi)	ESC ESC F ETX	1B 1B 46 03	27 27 70 3	
Gothic (alt., 17.1 cpi)	ESC ESC F 3	1B 1B 46 33	27 27 70 51	
Times Roman	ESC ESC F EOT	1B 1B 46 04	27 27 70 4	
Times Roman (alternate)	ESC ESC F 4	1B 1B 46 34	27 27 70 52	
Elite (12 cpi)	ESC ESC F ENQ	1B 1B 46 05	27 27 70 5	
Orator (10 cpi)	ESC ESC F BEL	1B 1B 46 07	27 27 70 7	
Courier Legal (10 cpi)	ESC ESC F HT	1B 1B 46 09	27 27 70 9	
Broadway (PS)	ESC ESC F FS	1B 1B 46 1C	27 27 70 28	
Micro (17.1 cpi)	ESC ESC F RS	1B 1B 46 1E	27 27 70 30	
Script (PS)	ESC ESC F NAK	1B 1B 46 15	27 27 70 21	
Gothic PS	ESC ESC F ACK	1B 1B 46 06	27 27 70 6	
Micro PS	ESC ESC F '	1B 1B 46 27	27 27 70 39	
OCR-A (10 cpi)	ESC ESC F SP	1B 1B 46 20	27 27 70 32	
OCR-B (10 cpi)	ESC ESC F ETB	1B 1B 46 17	27 27 70 23	
APL (10 cpi)	ESC ESC F EM	1B 1B 46 19	27 27 70 25	
Gen'l Scientific (10 cpi)	ESC ESC F LF	1B 1B 46 0A	27 27 70 10	
DEC Scientific (10 cpi)	ESC ESC F VT	1B 1B 46 0B	27 27 70 11	
Chemical (10 cpi)	ESC ESC F CAN	1B 1B 46 18	27 27 70 24	
Set print feature combination	ESC I *n*	1B 49 *n*	27 73 *n*	This sequence selects a combination of printing features, including font, print quality, and character spacing/cell size.
Gothic, draft, 10 cpi	ESC I NUL	1B 49 00	27 73 0	
Courier, letter, 10 cpi	ESC I STX	1B 49 02	27 73 2	
Times Roman, letter, PS	ESC I ETX	1B 49 03	27 73 3	
Gothic, draft, 12 cpi	ESC I BS	1B 49 08	27 73 8	
Elite, letter, 12 cpi	ESC I LF	1B 49 0A	27 73 10	
Gothic, draft, 17.1 cpi	ESC I DLE	1B 49 10	27 73 16	
Courier, letter, 17.1 cpi	ESC I DC2	1B 49 14	27 73 18	

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Text Functions—continued				
Set language	ESC ESC G *n*	1B 1B 47 *n*	27 27 71 *n*	These sequences select a language for the printer to use while printing text. The language setting causes the printer to replace some of the standard ASCII printable characters with alternate characters that are used in a specific language. The character replacements are shown in the *Control Panel* section of this guide, under the *Set Language* heading. ☞**Note:** These sequences apply only to fonts with international characters. Also, the ESC R *n* sequence is not supported when the IBM XL24 emulation is active.
English, US	ESC ESC G NUL	1B 1B 47 00	27 27 71 0	
English, US (alternate)	ESC R NUL	1B 52 00	27 82 0	
French	ESC ESC G SOH	1B 1B 47 01	27 27 71 1	
French (alternate)	ESC R SOH	1B 52 01	27 82 1	
German	ESC ESC G STX	1B 1B 47 02	27 27 71 2	
German (alternate)	ESC R STX	1B 52 02	27 82 2	
English, UK	ESC ESC G ETX	1B 1B 47 03	27 27 71 3	
English, UK (alternate)	ESC R ETX	1B 52 03	27 82 3	
Danish I	ESC ESC G EOT	1B 1B 47 04	27 27 71 4	
Danish I (alternate)	ESC R EOT	1B 52 04	27 82 4	
Swedish	ESC ESC G ENQ	1B 1B 47 05	27 27 71 5	
Swedish (alternate)	ESC R ENQ	1B 52 05	27 82 5	
Italian	ESC ESC G ACK	1B 1B 47 06	27 27 71 6	
Italian (alternate)	ESC R ACK	1B 52 06	27 82 6	
Spanish I	ESC ESC G BEL	1B 1B 47 07	27 27 71 7	
Spanish I (alternate)	ESC R BEL	1B 52 07	27 82 7	
Japanese	ESC ESC G BS	1B 1B 47 08	27 27 71 8	
Japanese (alternate)	ESC R BS	1B 52 08	27 82 8	
Norwegian	ESC ESC G HT	1B 1B 47 09	27 27 71 9	
Norwegian (alternate)	ESC R HT	1B 52 09	27 82 9	
Danish II	ESC ESC G LF	1B 1B 47 0A	27 27 71 10	
Danish II (alternate)	ESC R LF	1B 52 0A	27 82 10	
Spanish II	ESC ESC G VT	1B 1B 47 0B	27 27 71 11	
Spanish II (alternate)	ESC R VT	1B 52 0B	27 82 11	
Portuguese	ESC ESC G FF	1B 1B 47 0C	27 27 71 12	
Portuguese (alternate)	ESC R FF	1B 52 0C	27 82 12	
Print character string	ESC \ *n1 n2 list*	1B 5C *n1 n2 list*	27 92 *n1 n2 list*	This sequence prints a character string beginning at the current print position. Any printable character can be included in the series, even those assigned control codes. The values of variables *n1* and *n2* define the number of characters to print. This number equals the number of character codes in *list*. The printer interprets *n1* and *n2* as follows: Number of characters = (256 x *n2*) + *n1* The *list* is a series of character codes for the characters to print. For example, to print the characters assigned codes 10 through 20 decimal, the correct sequence is 27 92 11 0 10 11 12 13 14 15 16 17 18 19 20 (decimal). ☞**Note:** This sequence is not supported when an Epson emulation is active.

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Text Functions—continued				
Print character	ESC ^ *n*	1B 5E *n*	27 94 *n*	This sequence prints a character that is assigned a valid control code. The value of variable *n* in the sequence is the control code assigned to the character. For example, to print the music note symbol assigned to the CR control code, the correct sequence is ESC ^ CR.
Enable/disable characters with codes 128-159, 255				These sequences enable and disable the printing of international characters assigned to codes 128 through 159 and 255. When disabled, the printer performs the control functions assigned to these codes.
Enable	ESC 6	1B 36	27 54	
Disable	ESC 7	1B 37	27 55	
Enable/disable characters in control code range	ESC I *n*	1B 49 *n*	27 73 *n*	This sequence enables and disables the printing of characters with codes 0 to 6, 16, 17, 19, 21 to 26, 28 to 31, 129 to 134, 144, 145, 147, 149 to 154, and 156 to 159 decimal. ☞**Note:** This sequence is not supported when the IBM XL24 emulation is active.
Enable	ESC I 1	1B 49 31	27 73 49	
Disable	ESC I 0	1B 49 30	27 43 48	
Select characters for codes above 159	ESC t *n*	1B 74 *n*	27 116 *n*	This sequence selects the characters that print for codes above 159. The sequence can select either the italic ASCII characters or the normal IBM graphic characters. With the italic characters selected, add 128 to the normal character code to print the italicized version. For example, to print an italicized letter A (code 65 decimal), send code 193 (65 + 128 = 193).
Italics	ESC t 0	1B 74 30	27 116 48	
Graphics	ESC t 1	1B 74 31	27 116 49	
Bold printing				These sequences start and end bold printing at the current print position. For bold, the printer prints each character twice at the character's normal print position (this requires a second printing pass over the line).
Start	ESC G	1B 47	27 71	
End	ESC H	1B 48	27 72	
Shadow printing				These sequences start and end shadow printing at the current print position. For shadow, the printer prints each character twice—once at the character's normal print position, and once 1/120-inch to the right of this position (this requires a second printing pass over the line).
Start	ESC E	1B 45	27 69	
End	ESC F	1B 46	27 70	

Table D-6. Epson and IBM Escape Sequences—continued

Function	ASCII	Hexadecimal	Decimal	Description
Text Functions—continued				
Automatic underscoring	ESC - *n*	1B 2D *n*	27 45 *n*	This sequence starts and ends automatic underscoring of characters and spaces.
Start	ESC - 1	1B 2D 31	27 45 49	
End	ESC - 0	1B 2D 30	27 45 48	
Slant printing (italics)	ESC ESC S *n*	1B 1B 53 *n*	27 27 83 *n*	These sequences start and end slant printing, wherein characters slant forward to simulate italics.
Start	ESC ESC S 1	1B 1B 53 31	27 27 83 49	
Start (alternate)	ESC ESC S 2	1B 1B 53 32	27 27 83 50	
Start (alternate)	ESC ESC S 3	1B 1B 53 33	27 27 83 51	☞**Note:** The ESC 4 and ESC 5 sequences are not supported when the IBM XL24 emulation is active.
Start (alternate)	ESC 4	1B 34	27 52	
End	ESC ESC S 0	1B 1B 53 30	27 27 83 48	
End (alternate)	ESC 5	1B 35	27 53	
Super / subscripting				These sequences start and end automatic superscripting and subscripting of characters. Both superscript and subscript characters are half the normal height. Superscript characters print above the normal print line; subscript characters print below the normal print line.
Subscripting	ESC S 1	1B 53 31	27 83 49	
Subscripting (alternate)	ESC ESC V 1	1B 1B 56 31	27 27 86 49	
Superscripting	ESC S 0	1B 53 30	27 83 48	
Superscripting (alternate)	ESC ESC V 2	1B 1B 56 32	27 27 86 50	
End	ESC T	1B 54	27 84	
End (alternate)	ESC ESC V 0	1B 1B 56 30	27 27 86 48	
Double-high / double-wide ..... printing	ESC [@ EOT NUL NUL NUL *n1 n2*	1B 5B 40 04 00 00 00 *n1 n2*	27 91 64 4 0 0 0 *n1 n2*	This sequence starts and ends double-high and/or double-wide printing. In double-high printing, characters print twice their normal height. In double-wide printing, characters print twice their normal width. The value of variable *n1* determines whether double-high printing starts or ends and whether line spacing changes to accommodate double-high characters:

Double-High	*Line Spacing*	*ASCII*	*Variable n1 Hex*	*Dec*
No change	No change	NUL	00	0
End	No change	SOH	01	1
Start	No change	STX	02	2
No change	6 lines/inch	DLE	10	16
End	6 lines/inch	DC1	11	17
Start	6 lines/inch	DC2	12	18
No change	3 lines/inch	SP	20	32
End	3 lines/inch	!	21	33
Start	3 lines/inch	"	22	34

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Text Functions—continued				
Double-high / double-wide ..... printing *(continued)*	ESC [@ EOT NUL NUL NUL *n1 n2*	1B 5B 40 04 00 00 00 *n1 n2*	27 91 64 4 0 0 0 *n1 n2*	The value of variable *n2* determines whether double-wide printing starts or ends: *Variable n2* *Double-Wide* — *ASCII* — *Hex* — *Dec* No change — NUL — 00 — 0 End — SOH — 01 — 1 Start — STX — 02 — 2 For example, to start double-high and double-wide printing with line spacing set to 3 lpi, the correct sequence is 27 91 64 4 0 0 0 34 2 (decimal).
Double-high printing				These sequences start and end double-high printing, wherein characters print twice their normal height. The sequences do *not* change the current line spacing.
Start	ESC ESC H 1	1B 1B 48 31	27 27 72 49	
Start (alternate)	ESC w 1	1B 77 31	27 119 49	
End	ESC ESC H 0	1B 1B 48 30	27 27 72 48	
End (alternate)	ESC w 0	1B 77 30	27 119 48	
Double-wide printing	ESC ESC W *n*	1B 1B 57 *n*	27 27 87 *n*	This sequence starts and ends double wide printing, wherein characters print twice their normal width. This sequence does *not* change the current character spacing.
Start	ESC ESC W 1	1B 1B 57 31	27 27 87 49	
End	ESC ESC W 0	1B 1B 57 30	27 27 87 48	
Double-wide printing	ESC W *n*	1B 57 *n*	27 87 *n*	This sequence starts and ends double wide printing, wherein characters print twice their normal width. This sequence also doubles the character spacing to accommodate the wider characters. A DC4 code does not turn off double-wide printing started with this sequence.
Start	ESC W 1	1B 57 31	27 87 49	
End	ESC W 0	1B 57 30	27 87 48	
One-line double-wide ..... printing	ESC SO	1B 0E	27 14	This sequence starts and ends double wide printing on the current line and doubles the character spacing to accommodate the wider characters. A DC4 code or any control code or escape sequence that causes paper movement ends double-wide printing and resumes normal character spacing. The ESC ESC W 0 and ESC W 0 sequences also end double-wide printing started with ESC SO.
Set master print mode	ESC ! *n*	1B 21 *n*	27 33 *n*	This sequence sets many unique print feature combinations. The value of variable *n* determines which modes are on and which are off. To find the correct *n* value, add up the numbers of the desired features: 0 - 10 pitch — 4 - Condensed — 32 - Dble-wide 1 - 12 pitch — 8 - Shadow — 64 - Italic 2 - Proportional — 16 - Bold — 128 - Underscore For example, to select 12-pitch, shadow, italic and underscore, the correct *n* value is 201 (1 + 8 + 64 + 128 = 201). This sequence ends all print features in the list that are not selected. Also, a proportional printing selection overrides 10- and 12-pitch selections.

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Text Functions—continued				
Automatic formatting	ESC a *n*	1B 61 *n*	27 97 *n*	This sequence starts and ends automatic formatting modes, wherein the printer stores all subsequent data in a special buffer. When the printer receives any code or sequence that causes paper movement, it prints the stored data as follows: ✓ In center mode, data prints centered on the point that is midway between the left and right margins. If a line is too long to fit between the margins, the printer performs line wrapping and centers each line. ✓ In flush right mode, data prints so that the line ends at the right margin. If a line is too long to fit, the printer performs line wrapping and prints each line flush right. ✓ In justify mode, data prints justified between the left and right margins. If a line is too long to be justified, the printer performs line wrapping and then justifies each line. The printer does not justify any line with a carriage return.
Start centering	ESC a 1	1B 61 31	27 97 49	
Start flush right	ESC a 2	1B 61 32	27 97 50	
Start justify	ESC a 3	1B 61 33	27 97 51	
End all formatting	ESC a 0	1B 61 30	27 97 48	
Proportional printing	ESC p *n*	1B 70 *n*	27 112 *n*	These sequences start and end the proportional mode, wherein the printer spaces characters by moving a specific number of PS units, printing the character, and then moving by the same number of PS units again. If the active font is a PS font, the printer uses the PS unit values prestored in the font. If the active font is a fixed-pitch font, the printer uses one-half the normal character spacing as the number of PS units for every character. All PS fonts contain prestored PS unit values for characters. A PS unit value represents one-half the space, in multiples of 1/120-inch, that is required to print and space a character. PS unit values range from 2 to 8. For example, the letter "V" has a PS unit value of 6, so it prints centered with a space of 12/120-inch (move 6 PS units, print the "V", and then move 6 PS units). Or, the letter "i" has a PS unit value of 3, so it prints centered within a space of 6/120-inch (move 3 PS units, print the "i", and then move 3 PS units). To determine the total distance from the center line of one character to the center line of the next character, just add the two characters' PS unit values. In the example above, the distance between the center of the "V" and the center of the "i" is 9/120-inch. All numeric characters (0 to 9) have the same PS unit value. After ending proportional mode, character spacing resets to the default character spacing of the active font. If the active font is a PS font, character spacing resets to 12 characters per inch. ☞**Note:** The ESC P *n* sequence is not supported when an Epson emulation is active.
Start	ESC p 1	1B 70 31	27 112 49	
Start (alternate)	ESC P 1	1B 50 31	27 80 49	
End	ESC p 0	1B 70 30	27 112 48	
End (alternate)	ESC P 0	1B 50 30	27 80 48	

Table D-6. Epson and IBM Escape Sequences—continued

<table>
<tr><th>Function</th><th>ASCII</th><th>Hexadecimal</th><th>Decimal</th><th>Description</th></tr>
<tr><td colspan="5">Text Functions—continued</td></tr>
<tr><td>Wide text printing .....
Enable .....
Disable .....</td><td>ESC ESC t n
ESC ESC t 1
ESC ESC t 0</td><td>1B 1B 74 n
1B 1B 74 31
1B 1B 74 30</td><td>27 27 116 n
27 27 116 49
27 27 116 48</td><td>This sequence enables and disables wide text printing Wide-carriage printers can print up to 16 inches across; narrow-carriage printers can print up to 11 inches across. When wide text printing is disabled, the leftmost and rightmost print positions, margins and horizontal tabs return to their original locations.

With wide text printing enabled, text prints unidirection-ally; that is, text printing occurs only while the carriage moves from left-to-right across the platen. Also, the letter- and memo-quality print speeds are slower than normal.

This sequence does not affect graphics printing. If you want to print wide graphics, you must use the Wide Graphics sequence.

☞Note: With wide text printing enabled, be sure to load paper in the printer so that it aligns with the blue line on the paper scale. This ensures that printing does not run off the left side of the page.</td></tr>
<tr><td colspan="5">Graphic Functions</td></tr>
<tr><td>Print Epson JX graphics .....</td><td>ESC * m
n1 n2 list</td><td>1B 2A m
n1 n2 list</td><td>27 42 m
n1 n2 list</td><td>This sequence prints bit-image graphics, wherein character codes no longer print characters, but instead print 8-dot-high columns of dots on the current print line. Depending on the mode, the columns are spaced from 1/60 to 1/240 inch apart. This sequence does not change the current line spacing. Variable m in the sequence determines which graphics mode the printer uses:

<table>
<tr><th></th><th></th><th colspan="3">Variable m</th></tr>
<tr><th>Mode</th><th>Resolution</th><th>ASCII</th><th>Hex</th><th>Dec</th></tr>
<tr><td>Single</td><td>72V x 60H dpi</td><td>NUL</td><td>00</td><td>0</td></tr>
<tr><td>Double</td><td>72V x 120H dpi</td><td>SOH</td><td>01</td><td>1</td></tr>
<tr><td>HS double</td><td>72V x 120H dpi</td><td>STX</td><td>02</td><td>2</td></tr>
<tr><td>Quadruple</td><td>72V x 240H dpi</td><td>ETX</td><td>03</td><td>3</td></tr>
<tr><td>Epson QX-10</td><td>72V x 80H dpi</td><td>EOT</td><td>04</td><td>4</td></tr>
<tr><td>One-to-one</td><td>72V x 72H dpi</td><td>ENQ</td><td>05</td><td>5</td></tr>
<tr><td>Other CRTs</td><td>72V x 90H dpi</td><td>ACK</td><td>06</td><td>6</td></tr>
</table>
In the HS double and quadruple modes, consecutive hori-xontal dots are not permitted. If the sequence specifies consecutive horizontal dots, the printer does not print the second dot.

Variables n1 and n2 define the number of columns to print. This number equals the number of bytes in the list. The printer interprets n1 and n2 as follows:

Number of columns = (256 x n2) + n1</td></tr>
</table>

Table D-6. Epson and IBM Escape Sequences—continued

<table>
<tr><th>Function</th><th>ASCII</th><th>Hexadecimal</th><th>Decimal</th><th>Description</th></tr>
<tr><td colspan="5">Graphic Functions—continued</td></tr>
<tr><td>Print Epson JX ..... graphics (continued)</td><td>ESC * m
n1 n2 list</td><td>1B 2A m
n1 n2 list</td><td>27 42 m
n1 n2 list</td><td>For example, to print 300 columns, n2 would be 1 and n1 would be 44 (300 = (256 x 1) + 44).

The list in the sequence is a series of codes that define the columns to print. The first code defines the first column, the second code defines the second column, and so on. Each bit in a code controls a specific dot in the column. The most significant bit controls the top dot, the next bit controls the second dot, and so on. If the bit is "1", the dot prints; if the bit is "0", the dot does not print. For example, FF hex prints all eight dots in the column, 00 hex prints no dots, 0F hex prints the lower four dots, and F0 hex prints the upper four dots.</td></tr>
<tr><td>Print Epson LQ-2550 ..... graphics</td><td>ESC * m
n1 n2 list</td><td>1B 2A m
n1 n2 list</td><td>27 42 m
n1 n2 list</td><td>This sequence prints bit-image graphics, wherein character codes no longer print characters, but instead print 8-dot-high or 24-dot-high columns of dots on the current print line. Depending on the mode, the columns are spaced from 1/60 to 1/360 inch apart and dots within each column are spaced either 1/72 inch apart or 1/180 inch apart. This sequence does not change the current line spacing. Variable m in the sequence determines which graphics mode the printer uses.

<table>
<tr><th rowspan="2">Mode</th><th rowspan="2">Resolution</th><th colspan="3">Variable m</th></tr>
<tr><th>ASCII</th><th>Hex</th><th>Dec</th></tr>
<tr><td>Single</td><td>72V x 60H dpi</td><td>NUL</td><td>00</td><td>0</td></tr>
<tr><td>Double</td><td>72V x 120H dpi</td><td>SOH</td><td>01</td><td>1</td></tr>
<tr><td>HS double</td><td>72V x 120H dpi</td><td>STX</td><td>02</td><td>2</td></tr>
<tr><td>Quadruple</td><td>72V x 240H dpi</td><td>ETX</td><td>03</td><td>3</td></tr>
<tr><td>CRT I</td><td>72V x 80H dpi</td><td>EOT</td><td>04</td><td>4</td></tr>
<tr><td>CRT II</td><td>72V x 90H dpi</td><td>ACK</td><td>06</td><td>6</td></tr>
<tr><td>Single</td><td>180V x 60H dpi</td><td>SP</td><td>20</td><td>32</td></tr>
<tr><td>Double</td><td>180V x 120H dpi</td><td>!</td><td>21</td><td>33</td></tr>
<tr><td>CRT III</td><td>180V x 90H dpi</td><td>&</td><td>26</td><td>38</td></tr>
<tr><td>Triple</td><td>180V x 180H dpi</td><td>'</td><td>27</td><td>39</td></tr>
<tr><td>Hex</td><td>180V x 360H dpi</td><td>(</td><td>28</td><td>40</td></tr>
</table>

In the HS double, quadruple and hex modes, consecutive horizontal dots are not permitted. If the sequence specifies consecutive horizontal dots, the printer does not print the second dot.

Variables n1 and n2 define the number of columns to print. For modes with 72 dots per vertical inch, this number equals the number of bytes in the list. For modes with 180 dots per vertical inch, this number equals one-third the number of bytes in the list. The printer interprets n1 and n2 as follows:

Number of columns = (256 x n2) + n1

For example, to print 300 columns, n2 would be 1 and n1 would be 44 (300 = (256 x 1) + 44).</td></tr>
</table>

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Graphic Functions—continued				
Print Epson LQ-2550 graphics *(continued)*	ESC * *m n1 n2 list*	1B 2A *m n1 n2 list*	27 42 *m n1 n2 list*	The *list* in the sequence is a series of codes that define the columns to print. Modes with 72 dots per vertical inch print 8-dot-high columns. For these modes, the first code defines the first column, the second code defines the second col-umn, and so on. Each bit in a code controls a specific dot in the column. The most significant bit controls the top dot, the next bit control the second dot, and so on. If the bit is "1", the dot prints; if the bit is "0", the dot does not print. For example, FF hex prints all eight dots in the column, 00 hex prints no dots, 0F hex prints the lower four dots, and F0 hex prints the upper four dots. Modes with 180 dots per vertical inch print 24-dot-high-columns. For these modes, the first three codes define the first column, the second three codes define the second col-umn, and so on. Each bit in a code controls a specific dot in the column. The most significant bit of the first code con-trols the top dot, the next bit controls the second dot, and so on. The most significant bit of the second code controls the ninth dot from the top, the next bit controls the tenth dot, and so on. And finally, the most significant bit of the third code controls the 17th dot from the top, the next bit con-trols the 18th dot, and so on. If the bit is "1", the dot prints; if the bit is "0", the dot does not print. For example, FF FF FF hex prints all 24 dots in the column, 00 00 00 hex prints no dots, 00 FF 00 hex prints the middle eight dots, and 80 00 01 hex prints the top and bottom dots.
Print IBM XL24 graphics	ESC [g *n1 n2 m list*	1B 5B 67 *n1 n2 m list*	27 91 103 *n1 n2 m list*	This sequence starts any one of eight different graphics modes, wherein character codes no longer print characters, but instead print 8-dot-high or 24-dot-high columns of dots on the current print line. Depending on the mode, the columns are spaced from 1/60 to 1/360 inch apart and dots within each column are spaced either 1/72 inch apart or 1/180 inch apart. This sequences does *not* change line spacing. Variables *n1* and *n2* define the number of bytes in the *list*. For modes with 72 dots per vertical inch, this number equals the number of columns being defined plus one. For modes with 180 dots per vertical inch, this number equals three times the number of columns being defined plus one. The printer interprets *n1* and *n2* as follows: Number of bytes = (256 x *n2*) + *n1* For example, to print 300 columns in a graphics mode with 72 dots per vertical inch, *n2* would be 1 and *n1* would be 45 (300 = ((256 x 1) + 45) - 1).

Table D-6. Epson and IBM Escape Sequences—continued

<table>
<tr><th>Function</th><th>ASCII</th><th>Hexadecimal</th><th>Decimal</th><th>Description</th></tr>
<tr><td colspan="5">Graphic Functions—continued</td></tr>
<tr><td>Print IBM XL24 graphics (continued)</td><td>ESC [g n1 n2 m list</td><td>1B 5B 67 n1 n2 m list</td><td>27 91 103 n1 n2 m list</td><td>Variable m in the sequences determines which graphics mode the printer uses:

<table>
<tr><th></th><th></th><th colspan="3">Variable m</th></tr>
<tr><th>Mode</th><th>Resolution</th><th>ASCII</th><th>Hex</th><th>Dec</th></tr>
<tr><td>Single</td><td>72V x 60H dpi</td><td>NUL</td><td>00</td><td>0</td></tr>
<tr><td>Double</td><td>72V x 120H dpi</td><td>SOH</td><td>01</td><td>1</td></tr>
<tr><td>HS double</td><td>72V x 120H dpi</td><td>STX</td><td>02</td><td>2</td></tr>
<tr><td>Quadruple</td><td>72V x 240H dpi</td><td>ETX</td><td>03</td><td>3</td></tr>
<tr><td>Single</td><td>180V x 60H dpi</td><td>BS</td><td>08</td><td>8</td></tr>
<tr><td>Double</td><td>180V x 120H dpi</td><td>HT</td><td>09</td><td>9</td></tr>
<tr><td>Triple</td><td>180V x 180H dpi</td><td>VT</td><td>0B</td><td>11</td></tr>
<tr><td>Hex</td><td>180V x 360H dpi</td><td>FF</td><td>0C</td><td>12</td></tr>
</table>
In the HS double, quadruple and hex modes, consecutive horizontal dots are not permitted. If the sequence specifies consecutive horizontal dots, the printer does not print the second dot.

The list in the sequence is a series of codes that define the columns to print. Modes with 72 dots per vertical inch print 8-dot-high columns. For these modes, the first code defines the first column, the second code defines the sec-ond column, and so on. Each bit in a code controls a specific dot in the column. The most significant bit controls the top dot, the next bit controls the second dot, and so on. If the bit is "1", the dot prints; if the bit is "0", the dot does not print. For example, FF hex prints all eight dots in the col-umn, 00 hex prints no dots, 0F hex prints the lower four dots, and F0 hex prints the upper four dots.

Modes with 180 dots per vertical inch print 24-dot-high-columns. The first three codes define the first column, the second three codes define the second column, and so on. Each bit in a code controls a specific dot in the column. The most significant bit of the first code controls the top dot, the next bit controls the second dot, and so on. The most significant bit of the second code controls the ninth dot from the top, the next bit controls the tenth dot, and so on. And finally, the most significant bit of the third code controls the 17th dot from the top, the next bit controls the 18th dot, and so on. If the bit is "1", the dot prints; if the bit is "0", the dot does not print. For example, FF FF FF hex prints all 24 dots in the column, 00 00 00 hex prints no dots, 00 FF 00 hex prints the middle eight dots, and 80 00 01 hex prints the top and bottom dots.</td></tr>
</table>

Table D-6. Epson and IBM Escape Sequences—continued

<table>
<tr><th>Function</th><th>ASCII</th><th>Hexadecimal</th><th>Decimal</th><th>Description</th></tr>
<tr><td colspan="5">Graphic Functions—continued</td></tr>
<tr><td>Print single-density graphics</td><td>ESC K n1 n2 list</td><td>1B 4B n1 n2 list</td><td>27 75 n1 n2 list</td><td>This sequence prints single-density graphics at 72V x 60H dots per inch. Variables n1, n2 and list in the sequence operate the same as in the Print Epson JX Graphics sequence.</td></tr>
<tr><td>Print low-speed, double-density graphics</td><td>ESC L n1 n2 list</td><td>1B 4C n1 n2 list</td><td>27 76 n1 n2 list</td><td>This sequence prints low-speed, double-density graphics at 72V x 120H dots per inch. Variables n1, n2 and list in the sequence operate the same as in the Print Epson JX Graphics sequence.</td></tr>
<tr><td>Print high-speed, double-density graphics</td><td>ESC Y n1 n2 list</td><td>1B 59 n1 n2 list</td><td>27 89 n1 n2 list</td><td>This sequence prints high-speed, double-density graphics at 72V x 120H dots per inch. Variables n1, n2 and list in the sequence operate the same as in the Print Epson JX Graphics sequence. In this graphics mode, consecutive horizontal dots are not permitted. If the sequence specifies consecutive horizontal dots, the printer does not print the second dot.</td></tr>
<tr><td>Print quadruple-density graphics</td><td>ESC Z n1 n2 list</td><td>1B 5A n1 n2 list</td><td>27 90 n1 n2 list</td><td>This sequence prints quadruple-density graphics at 72V x 240H dots per inch. Variables n1, n2 and list in the sequence operate the same as in the Print Epson JX Graphics sequence. In this graphics mode, consecutive horizontal dots are not permitted. If the sequence specifies consecutive horizontal dots, the printer does not print the second dot.</td></tr>
<tr><td>Reassign alternate graphics mode</td><td>ESC ? n1 n2</td><td>1B 3F n1 n2</td><td>27 63 n1 n2</td><td>This sequence reassigns the function of ESC K, ESC L, ESC Y, or ESC Z, so that it performs any one of the other six Epson graphics modes. Variable n1 defines which sequence to reassign:

<table>
<tr><th rowspan="2">Sequence to Reassign</th><th colspan="3">Variable n1</th></tr>
<tr><th>ASCII</th><th>Hex</th><th>Dec</th></tr>
<tr><td>ESC K</td><td>K</td><td>4B</td><td>75</td></tr>
<tr><td>ESC L</td><td>L</td><td>4C</td><td>76</td></tr>
<tr><td>ESC Y</td><td>Y</td><td>59</td><td>89</td></tr>
<tr><td>ESC Z</td><td>Z</td><td>5A</td><td>90</td></tr>
</table>

Variable n2 defines which graphics mode to assign to the selected sequence:

<table>
<tr><th rowspan="2">Mode</th><th rowspan="2">Resolution</th><th colspan="3">Variable n2</th></tr>
<tr><th>ASCII</th><th>Hex</th><th>Dec</th></tr>
<tr><td>Single</td><td>72V x 60H dpi</td><td>NUL</td><td>00</td><td>0</td></tr>
<tr><td>Double</td><td>72V x 120H dpi</td><td>SOH</td><td>01</td><td>1</td></tr>
<tr><td>HS double</td><td>72V x 120H dpi</td><td>STX</td><td>02</td><td>2</td></tr>
<tr><td>Quadruple</td><td>72V x 240H dpi</td><td>ETX</td><td>03</td><td>3</td></tr>
<tr><td>Epson QX-10</td><td>72V x 80H dpi</td><td>EOT</td><td>04</td><td>4</td></tr>
<tr><td>One-to-one</td><td>72V x 72H dpi</td><td>ENQ</td><td>05</td><td>5</td></tr>
<tr><td>Other CRTs</td><td>72V x 90H dpi</td><td>ACK</td><td>06</td><td>6</td></tr>
</table>
</td></tr>
</table>

Table D-6. Epson and IBM Escape Sequences—continued

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Graphic Functions—continued				
Wide graphics				These sequences enable and disable wide graphics, wherein graphics print up to 16 inches across on *wide*-carriage printers and up to 11 inches across on *narrow*-carriage printers. To print full wide graphics, make sure the current horizontal print position is 0 before sending the graphics escape sequence. ☞**Note:** Text printing is unaffected by these sequences. To print wide text, you must use the *Wide Text Printing* escape sequence.
Enable	ESC ESC w	1B 1B 77	27 27 119	
Disable	ESC ESC s	1B 1B 73	27 27 115	
Miscellaneous Functions				
Set print gap	ESC ESC g	1B 1B 67	27 27 103	This sequence causes the printer to detect the forms thick-ness at the current print position and to reset the print gap for optimal print quality. Although the printer sets the print gap automatically each time a new form is loaded, you can use this sequence to reset the print gap at any location on the form. This is useful when printing on multi-thickness forms, such as forms with peel-off cards or labels.
Park paper	ESC ESC p	1B 1B 70	27 27 112	This sequence causes the printer to finish printing the cur-rent line and then reverse-feed the paper to the parked position. If pin-feed paper is not loaded when the printer receives this sequence, the printer ignores the sequence.
Select paper path	ESC ESC l *n*	1B 1B 6C *n*	27 27 108 *n*	This sequence selects a paper path for subsequent paper feeding. If pin-feed paper is loaded when the printer receives this sequence, the printer finishes printing the current line, parks the paper, and then switches to the specified paper path. If a cut sheet is loaded when the printer receives this sequence, the printer finishes printing the current line, ejects the cut sheet, and then switches to the specified paper path. If the sequence specifies the active paper path, the printer ignores the sequence.
Top	ESC ESC l NUL	1B 1B 6C 00	27 27 108 0	
Rear	ESC ESC l SOH	1B 1B 6C 01	27 27 108 1	
Bottom	ESC ESC l STX	1B 1B 6C 02	27 27 108 2	
Top-mounted tractor	ESC ESC l ETX	1B 1B 6C 03	27 27 108 3	

Bar Code Escape Sequences

Table D-7 lists the escape sequences that can be sent to the printer to print bar code symbols. For more information on printing bar code symbols, refer to the *Bar Codes* appendix in this guide and to the *AMT Bar Code Option Operating Guide* (part no. 337027) sold separately by AMT.

Table D-7. Bar Code Escape Sequences

Function	*ASCII*	*Hexadecimal*	*Decimal*	*Description*
Select bar code emulation	ESC ESC E BS	1B 1B 45 08	27 27 69 8	This sequence selects the bar code emulation.
Bar code format	ESC [*p1* ; *p2* ; *p3* ; *p4* ; *p5* ; *p6* ; *p7* ; *p8* }	1B 5B *p1* 3B *p2* 3B *p3* 3B *p4* 3B *p5* 3B *p6* 3B *p7* 3B *p8* 7D	27 91 *p1* 59 *p2* 59 *p3* 59 *p4* 59 *p5* 59 *p6* 59 *p7* 59 *p8* 125	This sequence selects a bar code symbology and defines the bar code height, whether to print a human-readable line of text, and the widths of bar code components.
Define symbology—*p1*				
Interleaved 2-of-5	0	30	48	Parameter *p1* in the sequence selects the bar code symbology. At left, are the possible *p1* values.
Code 3-of-9 (default)	4	34	52	
EAN-8	5	35	53	
EAN-13	6	36	54	Parameter *p2* defines the height of bar code symbols in 1/12-inch intervals. *p2* values can range from 1 to 120. If *p2* is set to 0, the printer will use the default height of 3/4 inch.
Codabar–a	9	39	57	
Codabar–b	10	31 30	49 48	
Codabar–c	11	31 31	49 49	
Codabar–d	12	31 32	49 50	
UPC-A	13	31 33	49 51	Parameter *p3* defines whether or not to print a human-readable line of text below each bar code symbol. *p3* must be set to 0 for no human-readable line or 1 to include the human-readable line.
UPC-E	14	31 34	49 52	
Code 128	15	31 35	49 53	
				Parameters *p4* through *p8* set the widths of bars and spaces in bar code symbols:
				Par. — *Setting* — *Formula* — *default Value* — *default Width* *p4* Narrow bar — 0.014 + (0.010 x (*p4* - 1)) — 1 — 0.014 *p5* Wide bar — 0.014 + (0.010 x (*p5* - 1)) — 3 — 0.034 *p6* Narrow space — 0.006 + (0.010 x (*p6* - 1)) — 2 — 0.016 *p7* Wide space — 0.006 + (0.010 x (*p7* - 1)) — 4 — 0.036 *p8* Interchar. gap — 0.006 + (0.010 x (*p8* - 1)) — 2 — 0.016
				Note: Parameters *p1* through *p8* are optional—you need only include the ones with values that you want to change. You must, however, include all of the semicolons in the command up to the last parameter defined.
Print Bar Code				
Start	ESC [4 t	1B 5B 34 74	27 91 52 116	These sequences tell the printer to print all subsequent data as a bar code symbol until an end sequence is received. The actual data to be encoded into the bar code symbol should be sent between the start and end sequences.
Start (alternate)	ESC [3 t	1B 5B 33 74	27 91 51 116	
Start (POSTNET only)	ESC z	1B 7A	27 122	
End	ESC [0 t	1B 5B 30 74	27 91 48 116	
End (Code 128 only)	\ ESC [0 t	5C 1B 5B 30 74	92 27 91 48 116	
End (POSTNET only)	\	5C	92	

ASCII Code Table

Table D-8 is an ASCII code table to assist you in decoding hexadecimal printouts.

Table D-8. ASCII Table

ASCII Character	*Dec*	*Hex*	*Binary*	*ASCII Character*	*Dec*	*Hex*	*Binary*
NUL (Ctrl @)	0	00	00000000	DLE (Ctrl P)	16	10	00010000
SOH (Ctrl A)	1	01	00000001	DC1 (Ctrl Q)	17	11	00010001
STX (Ctrl B)	2	02	00000010	DC2 (Ctrl R)	18	12	00010010
ETX (Ctrl C)	3	03	00000011	DC3 (Ctrl S)	19	13	00010011
EOT (Ctrl D)	4	04	00000100	DC4 (Ctrl T)	20	14	00010100
ENQ (Ctrl E)	5	05	00000101	NAK (Ctrl U)	21	15	00010101
ACK (Ctrl F)	6	06	00000110	SYN (Ctrl V)	22	16	00010110
BEL (Ctrl G)	7	07	00000111	ETB (Ctrl W)	23	17	00010111
BS (Ctrl H)	8	08	00001000	CAN (Ctrl X)	24	18	00011000
HT (Ctrl I)	9	09	00001001	EM (Ctrl Y)	25	19	00011001
LF (Ctrl J)	10	0A	00001010	SUB (Ctrl Z)	26	1A	00011010
VT (Ctrl K)	11	0B	00001011	ESC (Ctrl [)	27	1B	00011011
FF (Ctrl L)	12	0C	00001100	FS (Ctrl \)	28	1C	00011100
CR (Ctrl M)	13	0D	00001101	GS (Ctrl])	29	1D	00011101
SO (Ctrl N)	14	0E	00001110	RS (Ctrl 6)	30	1E	00011110
SI (Ctrl O)	15	0F	00001111	US (Ctrl _)	31	1F	00011111

Table D-8. ASCII Table—continued

ASCII Character	*Dec*	*Hex*	*Binary*	*ASCII Character*	*Dec*	*Hex*	*Binary*
SP (Space)	32	20	00100000	<	60	3C	00111100
!	33	21	00100001	=	61	3D	00111101
"	34	22	00100010	>	62	3E	00111110
#	35	23	00100011	?	63	3F	00111111
$	36	24	00100100	@	64	40	01000000
%	37	25	00100101	A	65	41	01000001
&	38	26	00100110	B	66	42	01000010
'	39	27	00100111	C	67	43	01000011
(	40	28	00101000	D	68	44	01000100
)	41	29	00101001	E	69	45	01000101
*	42	2A	00101010	F	70	46	01000110
+	43	2B	00101011	G	71	47	01000111
,	44	2C	00101100	H	72	48	01001000
-	45	2D	00101101	I	73	49	01001001
.	46	2E	00101110	J	74	4A	01001010
/	47	2F	00101111	K	75	4B	01001011
0	48	30	00110000	L	76	4C	01001100
1	49	31	00110001	M	77	4D	01001101
2	50	32	00110010	N	78	4E	01001110
3	51	33	00110011	O	79	4F	01001111
4	52	34	00110100	P	80	50	01010000
5	53	35	00110101	Q	81	51	01010001
6	54	36	00110110	R	82	52	01010010
7	55	37	00110111	S	83	53	01010011
8	56	38	00111000	T	84	54	01010100
9	57	39	00111001	U	85	55	01010101
:	58	3A	00111010	V	86	56	01010110
;	59	3B	00111011	W	87	57	01010111

Table D-8. ASCII Table—continued

ASCII Character	*Dec*	*Hex*	*Binary*	*ASCII Character*	*Dec*	*Hex*	*Binary*
X	88	58	01011000	t	116	74	01110100
Y	89	59	01011001	u	117	75	01110101
Z	90	5A	01011010	v	118	76	01110110
[	91	5B	01011011	w	119	77	01110111
\	92	5C	01011100	x	120	78	01111000
]	93	5D	01011101	y	121	79	01111001
^	94	5E	01011110	z	122	7A	01111010
_	95	5F	01011111	{	123	7B	01111011
`	96	60	01100000	|	124	7C	01111100
a	97	61	01100001	}	125	7D	01111101
b	98	62	01100010	~	126	7E	01111110
c	99	63	01100011	DEL	127	7F	01111111
d	100	64	01100100		128	80	10000000
e	101	65	01100101		129	81	10000001
f	102	66	01100110		130	82	10000010
g	103	67	01100111		131	83	10000011
h	104	68	01101000		132	84	10000100
i	105	69	01101001		133	85	10000101
j	106	6A	01101010		134	86	10000110
k	107	6B	01101011		135	87	10000111
l	108	6C	01101100		136	88	10001000
m	109	6D	01101101		137	89	10001001
n	110	6E	01101110		138	8A	10001010
o	111	6F	01101111		139	8B	10001011
p	112	70	01110000		140	8C	10001100
q	113	71	01110001		141	8D	10001101
r	114	72	01110010		142	8E	10001110
s	115	73	01110011		143	8F	10001111

Table D-8. ASCII Table—continued

ASCII Character	*Dec*	*Hex*	*Binary*	*ASCII Character*	*Dec*	*Hex*	*Binary*
	144	90	10010000		172	AC	10101100
	145	91	10010001		173	AD	10101101
	146	92	10010010		174	AE	10101110
	147	93	10010011		175	AF	10101111
	148	94	10010100		176	B0	10110000
	149	95	10010101		177	B1	10110001
	150	96	10010110		178	B2	10110010
	151	97	10010111		179	B3	10110011
	152	98	10011000		180	B4	10110100
	153	99	10011001		181	B5	10110101
	154	9A	10011010		182	B6	10110110
	155	9B	10011011		183	B7	10110111
	156	9C	10011100		184	B8	10111000
	157	9D	10011101		185	B9	10111001
	158	9E	10011110		186	BA	10111010
	159	9F	10011111		187	BB	10111011
	160	A0	10100000		188	BC	10111100
	161	A1	10100001		189	BD	10111101
	162	A2	10100010		190	BE	10111110
	163	A3	10100011		191	BF	10111111
	164	A4	10100100		192	C0	11000000
	165	A5	10100101		193	C1	11000001
	166	A6	10100110		194	C2	11000010
	167	A7	10100111		195	C3	11000011
	168	A8	10101000		196	C4	11000100
	169	A9	10101001		197	C5	11000101
	170	AA	10101010		198	C6	11000110
	171	AB	10101011		199	C7	11000111

Table D-8. ASCII Table—continued

ASCII Character	*Dec*	*Hex*	*Binary*	*ASCII Character*	*Dec*	*Hex*	*Binary*
	200	C8	11001000		228	E4	11100100
	201	C9	11001001		229	E5	11100101
	202	CA	11001010		230	E6	11100110
	203	CB	11001011		231	E7	11100111
	204	CC	11001100		232	E8	11101000
	205	CD	11001101		233	E9	11101001
	206	CE	11001110		234	EA	11101010
	207	CF	11001111		235	EB	11101011
	208	D0	11010000		236	EC	11101100
	209	D1	11010001		237	ED	11101101
	210	D2	11010010		238	EE	11101110
	211	D3	11010011		239	EF	11101111
	212	D4	11010100		240	F0	11110000
	213	D5	11010101		241	F1	11110001
	214	D6	11010110		242	F2	11110010
	215	D7	11010111		243	F3	11110011
	216	D8	11011000		244	F4	11110100
	217	D9	11011001		245	F5	11110101
	218	DA	11011010		246	F6	11110110
	219	DB	11011011		247	F7	11110111
	220	DC	11011100		248	F8	11111000
	221	DD	11011101		249	F9	11111001
	222	DE	11011110		250	FA	11111010
	223	DF	11011111		251	FB	11111011
	224	E0	11100000		252	FC	11111100
	225	E1	11100001		253	FD	11111101
	226	E2	11100010		254	FE	11111110
	227	E3	11100011		255	FF	11111111

Appendix

E

Specifications

Table E-1. Specifications

Item	*Specifications*
Physical Characteristics	
Height	
6310, 6350	8.2 inches (20.8 cm) paper support lowered
6310d, 6350d	11.4 inches (29 cm) paper support lowered
Width	
6310, 6310d	19 inches (48.3 cm)
6350, 6350d	24 inches (61 cm)
Depth	
All models	16.8 inches (42.7 cm) without paper deflector
Weight	
6310	40 pounds (18.1 kg)
6310d	48 pounds (21.8 kg)
6350	45 pounds (20.4 kg)
6350d	54 pounds (24.5 kg)

Table E-1. Specifications—continued

Item	*Specifications*
Printing Characteristics	
Printing method	24-pin impact dot-matrix with half-dot microshift
Dot diameter	0.3 millimeter
Movement	Bi-directional and logic-seeking
Color	Fully supported using color ribbon
Speeds	
Letter-quality	160 characters per second at 12 cpi
Memo-quality	320 characters per second at 12 cpi
Draft-quality	600 characters per second at 12 cpi
Maximum print width	
6310, 6310d	11 inches (28 cm)
6350, 6350d	16 inches (40.6 cm)
Noise level	Less than 55 dBA maximum
Controls and Indicators	
Control Panel	
Buttons	Form Feed, Line Feed, Paper Path, Paper Park, Alt, Bail/Set Top, Clear/Reset, Test/Status, Font/Pitch, Quality/Emul, Ready/Color and Setup/Print Density
Display	16-place, one-line alphanumeric liquid-crystal display (LCD)
Lights (LEDs)	Ready and Error
Select-dial	For paper/carriage movement and printer setup
Indicators	Forms thickness and tractor select

Table E-1. Specifications—continued

Item	*Specifications*
Motors, Solenoids, Sensors and Switches	
Motors	Carriage, line feed, ribbon lift, fan, auto gap, paper path select, and bottom tractor (on 6310d and 6350d models only)
Solenoids	Microshift, bail and printhead
Sensors	Carriage, paper, Select-dial (2), paper jam, auto gap (2), and bottom paper jam (6310d and 6350d models only)
Switches	Tractor select, cover open, ribbon home, color ribbon, power on/off, and voltage select
Interfaces	
Parallel	
Compatibility	Centronics type
Connector	36-pin female
Serial	
Compatibility	EIA RS-232-C (DTR mode)
Connector	DB-25 female
Serial settings	
Baud rates	75, 150, 300, 600, 1200, 2400, 4800, 9600 and 19200
Handshaking	DTR, XON/XOFF and ENQ/ACK
Parity	Even, odd, and none
Data bits	7 and 8
Stop bits	1 and 2
Special feature	Automatic interface switching
Options	Coax, Twin-ax, Ethernet and more

Table E-1. Specifications—continued

Item	*Specifications*
Emulations	
Standard	AMT, Diablo 630, Epson JX, Epson LQ-2550 (includes LQ-1500 and LQ-2500), IBM XL24 Proprinter, bar code and hexadecimal
Options	Many DEC, Apple and HP emulations
Vertical and Horizontal Spacing	
Line spacing	
User-selectable	2, 3, 4, 5, 6, 8, 9, 10 and 12 lines per inch
Software-selectable	1 to 360 lines per inch
Character spacing	
User-selectable	10, 12, 13.3, 15, 17.1 and 20 characters per inch and proportional
Software-selectable	1 to 120 characters per inch and proportional
Line length	
6310 user-selectable	8, 8.5 and 11 inches
6350 user-selectable	8, 13.6 and 16 inches
6310 software-select	
10-pitch	Up to 110 character columns
12-pitch	Up to 132 character columns
13.3-pitch	Up to 146 character columns
15-pitch	Up to 165 character columns
17.1-pitch	Up to 188 character columns
20-pitch	Up to 220 character columns
6350 software-select	
10-pitch	Up to 160 character columns
12-pitch	Up to 192 character columns
13.3-pitch	Up to 212 character columns
15-pitch	Up to 240 character columns
17.1-pitch	Up to 273 character columns
20-pitch	Up to 320 character columns

Table E-1. Specifications—continued

Item	*Specifications*
Fonts	
Fonts	Courier, Gothic, Times Roman and Elite
Character matrixes	
Draft mode	8V x 15H (one pass)
Memo mode	16V x 36H (one pass)
Letter mode	32V x 36H (two passes)
Pitches	5, 6, 6.6, 7.5, 8.5, 10, 12, 13.3, 15, 17.1 and 20 cpi
Character set	256-character IBM standard with international and graphic characters
Languages	English, French, German, Danish, Swedish, Italian, Spanish, Japanese, Norwegian, and Portuguese
Attributes	Expanded (double-high, double-wide and double-high/double-wide); italic; automatic bold, shadow, underscore, center and justify
Colors	Black, cyan, magenta, yellow, violet, green, and orange
Options	Many fixed-pitch and proportional fonts

Table E-1. Specifications—continued

Item	*Specifications*
	Graphics
One-pass resolutions	60V x 60H, 60V x 120H, 120V x 120H and 120V x 240H
Two-pass resolutions	240V x 120H and 240V x 240H
Emulation graphics	Up to 240V x 360H
Dots per column	Up to 32
Columns per line	
6350 & 6350d	
60H graphics	Up to 960
120H graphics	Up to 1,920
240H graphics	Up to 3,840
6310 & 6310d	
60H graphics	Up to 660
120H graphics	Up to 1,320
240H graphics	Up to 2,640
Max. image width	
6310 & 6310d	11 inches
6350 & 6350d	16 inches
Colors	All supported by software
	Ribbons
Type	Continuous loop, inked nylon fabric
Dimensions	20 millimeters x 16 meters
Ink	
Monochrome	Black
Color	Process colors—black, cyan, yellow, magenta
Life	
Monochrome	Exceeds 5 million characters
Color	Exceeds 2 million characters

Table E-1. Specifications—continued

Item	*Specifications*
	Paper Paths and Paper
Paper paths	Top and rear; bottom with pull tractor option or powered bottom-feed tractor on 6310d and 6350d
Feed methods	Friction for cut sheets; tractor for pin-fed paper
Special features	Tear bar, first-line printing, auto bail, paper out and paper jam sensing, demand document and paper park, automatic forms thickness detection and print gap adjustment, remote paper source selection
Cut sheet width	
6310, 6310d	From 3 to 12 inches (7.6 to 30.5 cm)
6350, 6350d	From 3 to 17 inches (7.6 to 43.2 cm)
Pin-feed paper width	
6310, 6310d	From 4.5 to 11.5 inches (11.4 to 29.2 cm) including pin-feed tear strips
6350, 6350d	From 4.5 to 16.5 inches (11.4 to 41.9 cm) including pin-feed tear strips
Paper length	From 3 to 30.3 inches (7.6 to 77 cm)
Paper thickness	
Single sheets	Up to 0.015 inch thick
Multipart forms	7-part forms up to 0.024 inch thick
Slew rate	1 to 10 inches per second
Option	Bottom-feed pull tractor

Table E-1. Specifications—continued

Item	*Specifications*
	Intelli-Cards and Memory
Intelli-card	1 receptacle
Input buffer	160 kilobytes (expandable to over 4 megabytes)
User save areas	5 independent setups plus factory defaults
	Bar Code Emulation
Symbologies	Interleaved 2-of-5, Code 3-of-9, Codabar, UPC-A, UPC-E, EAN-13, EAN-8, Code 128 and POSTNET
Compatibility	Genicom- and OTC-compatible command set
	Diagnostics
Status printout Standard Expanded	 Automatic printout of current printer status Automatic printout of all saved settings, including normally-hidden settings
Self test	Rotating character pattern
Hexadecimal dump	Hexadecimal printout of print data
Diagnostics	Full set of interactive tests to check all printer subsystems, including memory, sensors, ribbon alignment, printing alignment, carriage and printhead gap
Dynamic polling	On-going error checking and fault reporting

Table E-1. Specifications—continued

Item	*Specifications*
Power and Environmental Requirements	
Voltage	
U.S.	90 to 130 vac
International	180 to 260 vac
Frequency	47 to 63 Hz
Operating	
Temperature	7° to 46° C (45° to 115° F)
Humidity	10% to 90% noncondensing
Altitude	-100 to +10,000 feet
Storage	
Temperature	-20° to 60° C (-4° to 140° F)
Humidity	10% to 90% noncondensing
Altitude	-100 to +30,000 feet
Reliability and Agency Compliance	
Warranty	One year, parts and labor
Mean Time To Repair (MTTR)	Less than 15 minutes (average)
Mean Time Between Failure (MTBF)	15,000 hours average when operated at 25% duty cycle
Agencies	UL Listed, C-UL Listed, FCC Class B compliance, TUV compliance, CE compliance, ENERGY STAR compliant

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AMT Datasouth ACCEL-6300 Series Printers

Warranty Registration

Please complete this form and return it to AMT within 10 days of installation.

Name		Title	
Company name		Department	E-mail
Address			
City	State	ZIP	Phone
Printer model ❑ ACCEL-6310 ❑ ACCEL-6310d ❑ ACCEL-6350 ❑ ACCEL-6350d		Printer serial number	
Date purchased		Where purchased	

Please answer the following questions. This information will help AMT Datasouth meet your future printer needs.

1. Which industry classification most closely describes your organization? Check one.

- ❑ Accounting
- ❑ Agriculture
- ❑ Banking/finance
- ❑ Construction
- ❑ Data processing
- ❑ Education
- ❑ Engr./architectural
- ❑ Government
- ❑ Insurance
- ❑ Legal
- ❑ Manufacturing
- ❑ Medical/dental
- ❑ Non-profit organization
- ❑ Printing/publishing
- ❑ Real estate
- ❑ Research
- ❑ Retail trade
- ❑ Transportation
- ❑ Wholesale trade
- ❑ Other: _____

2. How many persons are employed by your organization?

- ❑ Self-employed
- ❑ 2-9
- ❑ 10-49
- ❑ 50-99
- ❑ 100-500
- ❑ Over 500

3. How did you learn about AMT printers?

- ❑ Advertisement
- ❑ Article
- ❑ Colleague
- ❑ Computer dealer
- ❑ Trade show
- ❑ Other: _____

If an advertisement or article, what magazine?

_____

If a trade show, what show?

_____

4. What was your main reason for purchasing an AMT printer? Check one.

- ❑ Capabilities
- ❑ Flexibility
- ❑ Price
- ❑ Recommendation
- ❑ Reliability
- ❑ Compatibility
- ❑ System component
- ❑ Other: _____

5. What software packages do you use?

_____

_____

6. What brand of computer do you use?

_____

7. For what applications will you use the AMT printer?

_____

_____

_____

8. Please rate the vendor that sold you the printer:

	Excellent	Good	Fair	Poor
Installation	❑	❑	❑	❑
Training	❑	❑	❑	❑
Knowledge	❑	❑	❑	❑
Follow-through	❑	❑	❑	❑
Overall	❑	❑	❑	❑

FOLD ON DASHED LINE (LOCATED ON REVERSE SIDE), TAPE AND MAIL

Please list any comments or suggestions you may have concerning the AMT Datasouth printer or the documentation.

Place Stamp Here

AMT Datasouth Corp.
4216 Stuart Andrew Blvd.
Charlotte, NC 28217

Attention: Warranty Department